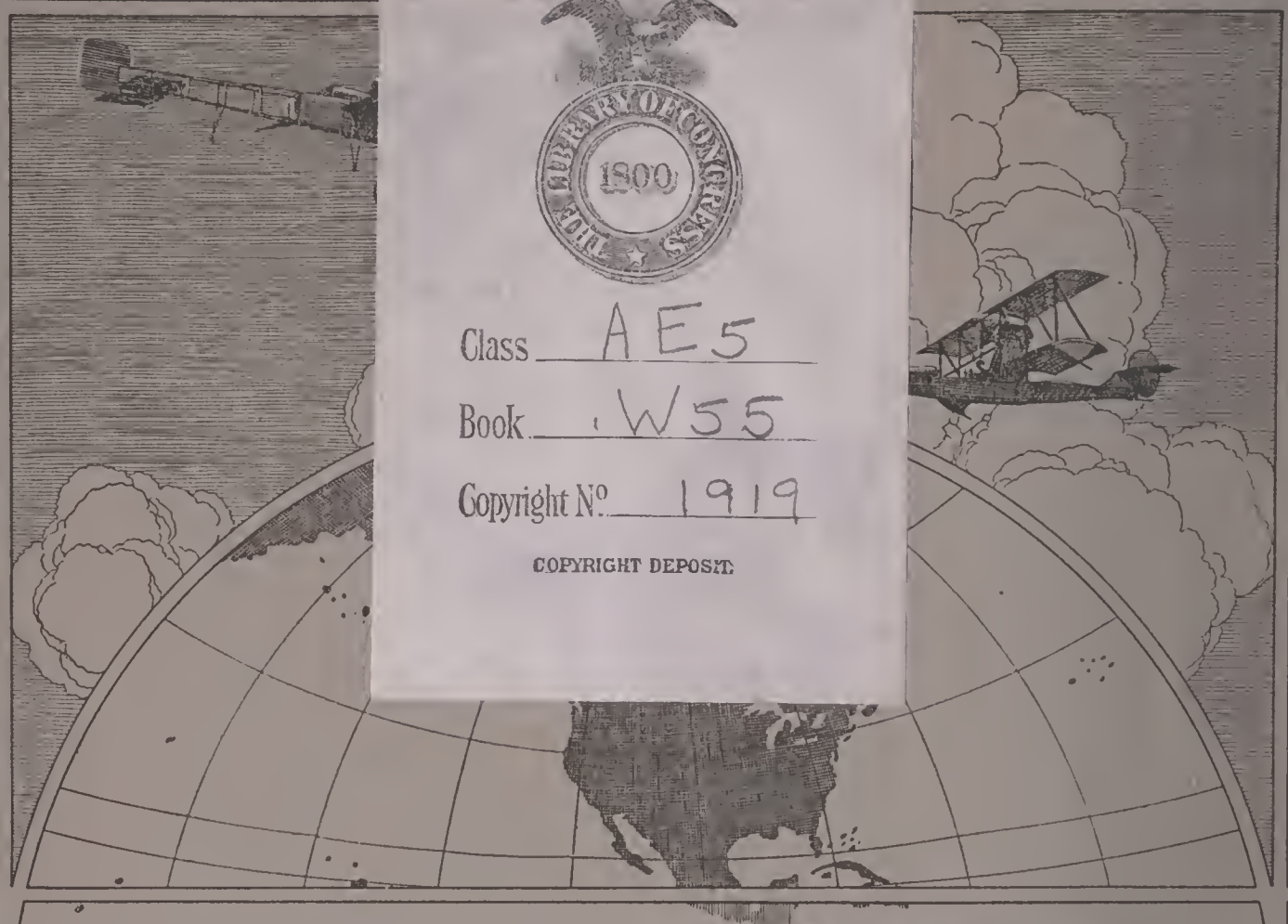
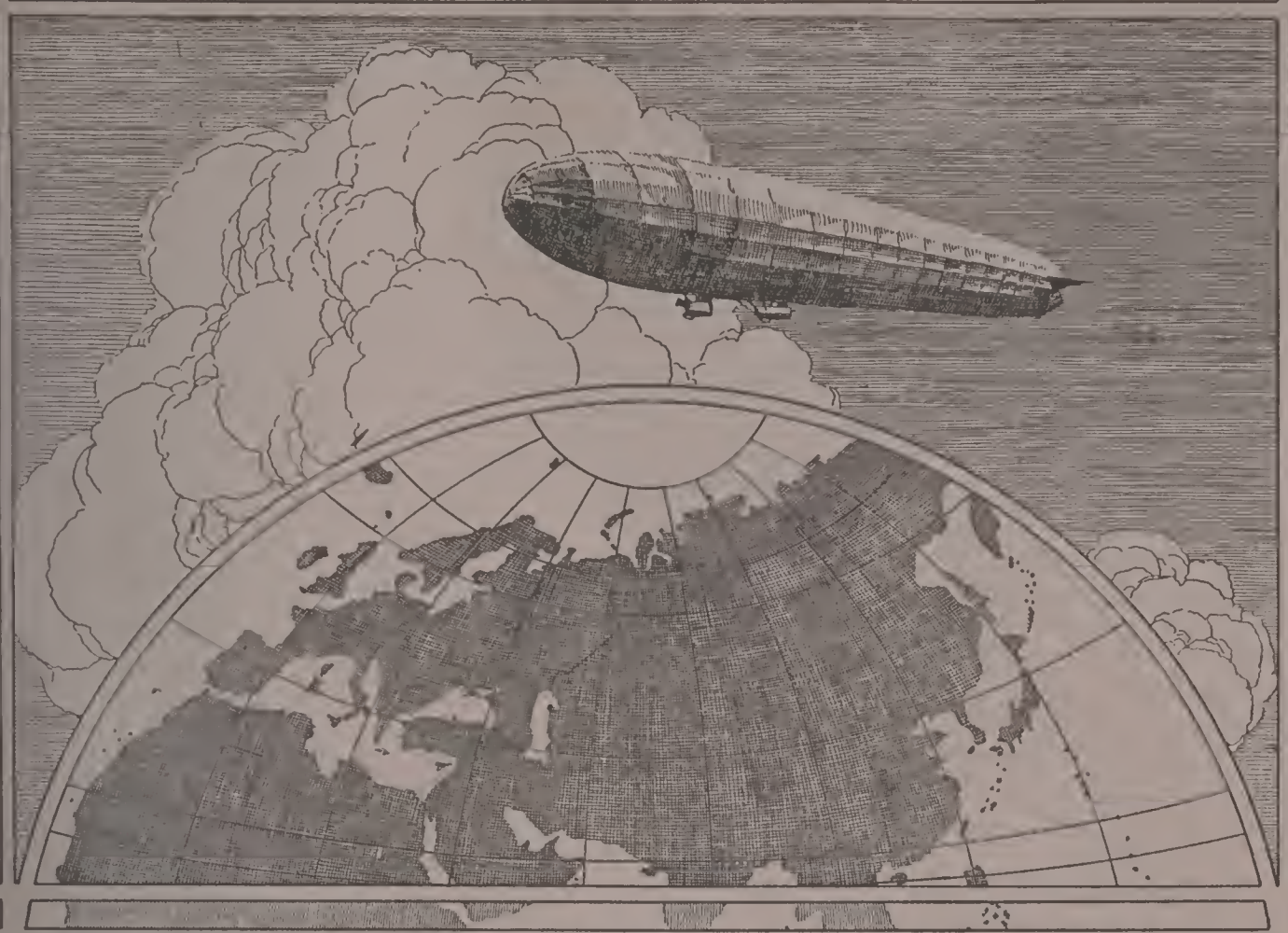
LIBRARY OF CONGRESS
1800

Class AE5
Book .W55
Copyright No. 1919

COPYRIGHT DEPOSIT



THE WORLD BOOK



THE WORLD BOOK

THE WORLD BOOK

ORGANIZED KNOWLEDGE IN STORY AND PICTURE

TRADE MARK REGISTERED

EDITOR-IN-CHIEF

M. V. O'SHEA

DEPARTMENT OF EDUCATION, UNIVERSITY OF WISCONSIN
MADISON, WISCONSIN

EDITOR

ELLSWORTH D. FOSTER

ASSOCIATE EDITOR NEW PRACTICAL REFERENCE LIBRARY; AUTHOR OF CYCLOPEDIA OF CIVIL GOVERNMENT

EDITOR FOR CANADA

GEORGE H. LOCKE

LIBRARIAN, TORONTO PUBLIC LIBRARY, TORONTO, ONTARIO

ASSISTED BY ONE HUNDRED FIFTY DISTINGUISHED SCIENTISTS, EDUCATORS, ARTISTS AND LEADERS OF THOUGHT IN THE UNITED STATES AND CANADA

In Ten Volumes *Volume Six*

1919

W. F. QUARRIE & COMPANY

TORONTO CHICAGO NEW YORK

AE 5
.W55
1919

THE WORLD BOOK

ORGANIZED KNOWLEDGE IN STORY AND PICTURE

NOV 14 1919

Copyright: 1917: 1918: 1919: Hanson-Bellows Publishing Company

©Cl.A536581

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE
TRADE MARK REGISTERED
VOLUME SIX

KUMQUAT, *kum'kwat,* a small, shrubby form of the orange tree, seldom exceeding six feet in height. It is a native of China, is extensively cultivated in Japan, and has been introduced into Florida, Alabama and California. The American yield is light, averaging 1,100 boxes a year, valued at $2,880, ninety-eight per cent of this quantity being produced in Florida. The kumquat withstands the effect of frost better than any other variety of orange, and under careful cultivation the tree may grow to eight or twelve feet. The fruit is oblong, a little larger than the Brazil nut, and is palatable and refreshing. The rind is sweet, and in China is made into a confection by preserving with sugar.

KURDISTAN, *koor dis tahn',* the Persian name for "the land of the Kurds," is an extensive region of Western Asia, forming a part of the Turkish and the Persian dominions, and

LOCATION MAP

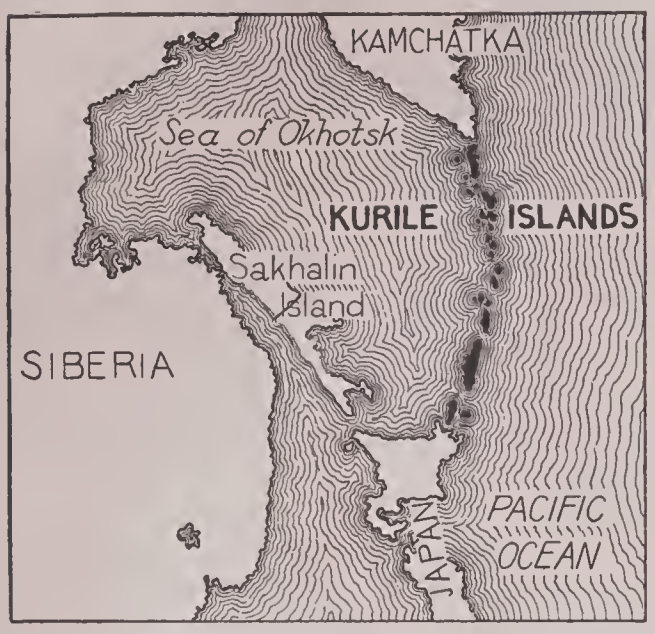
covering an area of about 56,000 square miles. With indefinite boundaries, it lies south of Armenia, and with that country was included in the Eastern theater of the war in the spring of 1916 (see War of the Nations). Though the most desperate fighting between the Turks and Russians occurred around Erzerum, in Armenia, the Russian advance reached the Lake Van region in Northern Kurdistan for the purpose of gaining control of the Bagdad Railway.

Turkish Kurdistan is a land of numerous and lofty mountains, but the ranges decrease in altitude beyond the Persian frontier. This region lies in the basins of the Tigris and Euphrates rivers and is watered by the Greater and the Lesser Zab. Cereals and southern fruits are the main agricultural products. The inhabitants are chiefly Kurds, a rugged people of Mohammedan faith. The wealthier Kurds are an independent, roving class who live in tents and are skilled breeders of cattle, horses, sheep and goats. Among them are fierce bandits who have often been the terror of their Armenian neighbors to the north. The chief cities of Turkish Kurdistan are Bitlis, Van and Diarbekir; of the Persian area, Kirmanshah and Irak-Ajemi. A well-known variety of Persian rug is imported from Kurdistan. Population, estimated at 2,500,000.

KURILE, *koo'ril,* **ISLANDS,** about thirty-two volcanic islands in the Northern Pacific Ocean, lying in a chain between Kamchatka and Yezo. They are a Japanese possession, obtained from Russia in 1875 in exchange for the southern half of Sakhalin, and have an area of 6,153 square miles. Most of the peaks are forest-covered, and the chief exports are timber, fish and fur. The principal islands are Itorup, Kunashiri, Paramushiri and Shumshu. The population is about 3,000. The Japanese name for the chain is *Chishima,* or *Thousand Islands,* and the original inhabitants were Ainos. See Aino. (See map, next page.)

KUROKI, *ku ro'ke,* Tamasada (1844-), a famous Japanese soldier whose ability won for him the titles of baron and count. He entered the army in 1871 and fought in all of his country's wars since that date. He first distinguished himself in the Chinese-Japanese war, commanded the first army against Russia and was

conspicuous in all the great battles of that struggle.



LOCATION MAP

KUROPATKIN, *koo ro paht'kin,* ALEXEI NIKOLAYEVITCH (1848-), a Russian general who was responsible for one of the most crushing defeats of the Russian armies in the Russo-Japanese War of 1904-1905 (which see). However, he later inspired his government with such confidence that he was given an important command during the greater conflict which broke out in Europe in 1914 (see WAR OF THE NATIONS). Kuropatkin bore a conspicuous part in the Russo-Turkish wars, became lieutenant in 1890 and Minister of War in 1898. When Russia and Japan began hostilities in 1904 he was given supreme command of the armies of the czar. After the great defeat at Mukden and the retreat of the troops to Tieling, he was succeeded as commander-in-chief by General Linievitch, taking the latter's place at the head of the first army in Manchuria.

In his story of the Russo-Japanese War, entitled *The Russian Army and the Japanese War,* Kuropatkin paid high tribute to the soldiers who had gone into the fray under conditions which pointed to sure defeat, and he likewise frankly acknowledged his own mistakes. Nine years after the close of the war with Japan his country entered into the struggle against the Central Empires of Europe, and in 1916 he was called upon to take charge of the Northern Division operating against General von Hindenburg, the command of that division having been relinquished by General Russky. An English translation of Kuropatkin's story of the war with Japan was published in New York in 1909.

KUSKOKWIM RIVER, the second largest river in Alaska, exceeded only by the Yukon in length and in importance. Its course is wholly in the southwestern part of the territory, and at one point is not more than fifty miles south of the Yukon. From Bethel, about 100 miles from the head of Kuskokwim Bay, the outlet of the river, steamers run during the season to Unalaska, the principal settlement on the Aleutian Islands, a distance of 523 miles. At Unalaska there is steamer connection with Seattle, nearly 2,900 miles southeast of the Aleutians.

For small vessels the river is navigable for more than 300 miles northeast of Bethel. Mining districts are rapidly developing in the whole Kuskokwim region, which is mountainous except along the river's course, and the stream is therefore rapidly increasing in importance as a means of transportation. It is along the Kuskokwim valley that reindeer have been introduced in largest numbers. At Bethel and in the vicinity there are over 5,000 head. In time the government system of railways will connect the head waters of the river with the Southern Alaska ports.

KYANITE, *ki'a nite,* also called DISTHENE, is a pale blue or white and blue garnet, found in rocks which divide along parallel planes. It is composed principally of aluminium silicate. The better grades are clear or translucent; the stone is capable of taking a high polish and is therefore used for ornaments. The principal sources are Massachusetts, Connecticut, Delaware, Virginia, Switzerland, the Tyrol and Bohemia. See GARNET.

KYOTO, or **KIOTO,** *kyo'toh,* the ancient sacred capital of Japan, is situated on the island of Hondo, in an extensive plain, 230 miles southwest of Tokyo, with which it is connected by railway. Kyoto is regularly and compactly built on the rectangular system. It is pervaded by an air of refinement, and many tea houses and pleasure gardens add to its attractiveness. The embroideries, enamels and inlaid bronze work of Kyoto are marvels of skilful handiwork, and its pottery, porcelain, ivory and bronze ornaments, crapes, velvets and brocades are famed throughout the world. The chief buildings of interest are the old imperial palace of the mikado and the residence of the shogun, which since the abolition of the office of shogun has been the seat of the city government. There are many fine temples and schools and an imperial university. Population, about 443,000.

L l

L, the twelfth letter of the English alphabet, was derived through the Greek and Roman from the Phoenician *lamed*. The Phoenician letter resembled a capital *L*, though the angle formed by the two lines was considerably less than a right angle; the word *lamed* is supposed to have meant *oxgoad*, and the letter to have been a picture of a whip with a lash. The Greeks changed the form of the letter so that it resembled an inverted *V*, but the Romans wrote it practically as capital *L* is made to-day. In sound, too, the letter has always been what it is at present, a liquid, or semivowel. It is very closely related to *r*, and the two are often substituted for each other in allied languages.

English has examples of words in which the *r* sound is given to *l*, as the first *l* in *colonel*. Many savages, it is said, cannot distinguish the two sounds, and it was very difficult at first to find out whether the capital of the Hawaiian Islands was *Honolulu* or *Honoruru*, as the natives used the two indiscriminately, seeming to perceive no difference in sound. *L* in English is sometimes silent, as in *palm;* but it serves in such instances to modify the sound of the vowel which precedes it. For the use of *l* in French and Spanish, see PRONUNCIATION OF FOREIGN NAMES.

LABIATAE, *la bi a' te*, the name applied by botanists to the numerous members of the mint family. In this plant division there are about 150 genera and nearly 3,000 species. Nearly all are native to North America; some are very useful to man, and others are worthless. Among them are herbs valuable in medicine, for the manufacture of perfumes and for cookery. Some species are weeds. Among the well-known members of the family are mint, marjoram, lavender, horehound, thyme, balm, sage and rosemary. Each of the above plants is described in these volumes.

LABOR, DEPARTMENT OF, the tenth executive department of the United States government, established March 4, 1913, "to develop the welfare of wage earners of the United States, to improve their working conditions and to advance their opportunities for profitable employment." In the organization of the Department a number of bureaus and divisions of what had been the Department of Commerce and Labor were transferred to it. These were the Bureau of Immigration, the Bureau of Naturalization, the Division of Information, Immigration Service at large and the Bureau of Labor, whose name was then changed to the Bureau of Labor Statistics. There was also added the Children's Bureau, a new division which had been organized in 1912 under the old Department of Commerce and Labor.

The head of the Department, the Secretary of Labor, is given power to act as mediator and to appoint commissioners of conciliation in labor disputes, wherever in his judgment the interests of industrial peace may require it to be done.

The Bureau of Labor Statistics is destined to be an important division of the government. It is charged with collecting and reporting at least once a year full and complete statistics of the conditions of labor and of the products and distribution of the products of labor; such parts of the information thus secured as the secretary may deem proper may be given to the public. This is usually accomplished in a series of annual reports.

The secretary is a member of the President's Cabinet but is not eligible to succession to the Presidency. His salary is $12,000 per year. This Department came into existence on the day that Woodrow Wilson became President of the United States; President Taft signed the bill creating the Department as the last official act of his administration. See CABINET.

The Department of Labor was the outgrowth of an insistent demand upon the government by the labor masses for adequate representation in the councils of the nation. The compact organization of labor and its growing political strength could not be ignored. Labor organizations were not satisfied with a comparatively weak Bureau within a principal department of the government; they felt that only a leading executive department could represent them with fitting dignity and strength.

LABOR, Division of, the name given by political economists to the conditions which exist in modern industry under which one man performs only one function, or at most a few functions, in a long series of operations. A better word for this condition of affairs would be *coöperation,* for all the workmen are engaged in completing one thing; no one of them alone could finish it without the coöperation of the others. In the manufacture of shoes, for example, there are a dozen or more processes; the old cobbler still cuts out the leather and builds up the entire shoe piece by piece, but in the modern factory one man cuts soles, another cuts uppers, another the tongues, and in nearly every step the workman is either helped by machinery or he merely operates a machine. The division of labor is, as a matter of fact, the result of the development of the factory system and of the accompanying use of machinery (see Factory and Factory System).

The arguments in favor of the division of labor are easily understood. It divides a complicated process into a series of simple operations, in which the workman becomes skilful in a shorter time than if he had to learn all the other operations as well. This fact means a saving of time, and therefore a saving of money and a reduction in the cost of production. Another great advantage is the inducement to invent new machinery and the tendency to use all machinery more efficiently. While it is probably true from the point of view of the community that the division of labor means economy, it is equally true that it may harm the individual workman. It increases the latter's skill in one field, but it lessens his experience and usefulness as an all-round workman. The objection is frequently heard that the modern factory, with its minute division of labor, destroys the individuality of its workmen and makes machines of them. The movement usually called Arts and Crafts (which see) is chiefly a protest against this tendency and an attempt to restore individuality to the craftsman and his products.

LABOR DAY, a legal holiday, usually the first Monday of September, observed in all of the states of the American Union and in every province of Canada. In New Orleans it is celebrated on the fourth Saturday of November, and in North Carolina on the first Thursday of September. It is not in effect in Alaska, the Philippines or Porto Rico. The celebration of Labor Day on the first Monday of September was inaugurated by the Knights of Labor in 1882. Different organizations of workingmen then petitioned for legislation making the day a legal holiday; in 1887 Colorado passed the first law to that effect. The occasion is marked by cessation from usual labor, and by parades, meetings and addresses by prominent labor leaders.

Since the Labor Congress in Berlin in 1890, the first of May has been set aside for labor demonstrations in some European countries.

LABOR LEGISLATION, a general term referring to all laws regulating the conditions of labor and the relations of employer and employee. The great number of laws now in existence, in Canada, in the United States, in England and practically every other civilized nation are the product of little more than a century of development. They are the direct result of the introduction of the factory, and their general purpose is to protect the workman from unfair and unhealthful conditions of labor. In other words, labor legislation is designed to win for the workman rights or privileges which he is not individually strong enough to secure.

As long as the employer himself was a workman—a master workman surrounded by his artisans and apprentices—a kindly, human relationship existed between master and man. But the introduction of automatic machinery in various branches of manufacturing wrought a great change. The employer gradually became a capitalist, not a worker; he had little direct contact with the operatives, and was not intimate with their surroundings and their daily life. His chief interest in them, possibly, was to get a maximum amount of work for a minimum amount of pay. The workers were often forced to labor too long hours, sometimes under miserable working conditions.

In 1750 the relation of employer to workmen was somewhat paternalistic; by 1800 the pendulum had swung sharply in the reverse direction, and extreme individualism was the rule. By 1900 the pendulum was far back on its way to a paternal attitude, but this time it was the government, not the employer, whose duty it was to protect the workman. The first laws regulating labor in factories were passed in England in 1802, and in Germany, France and other European countries soon afterward. But the great body of labor legislation now in force is the product of the last half century. In almost all European countries labor legislation is national in its scope, and the entire field of the relation of labor and capital is a

national concern. In the United States, in Canada and in Australia, on the contrary, such legislation is mainly state or provincial in character. Under such a condition, when every state and province passes its own labor laws, there is a great variety in their provisions. In this article, therefore, it is possible only to indicate general tendencies.

Hours of Labor and Minimum Age. More than half of the states and provinces have limited the hours of labor for children and women. The earliest legislation on this subject was in England, and limited the working-day to twelve hours. Later the average was ten hours, and the tendency now is to permit women and children to work only eight hours. A few states limit the length of the working-day for men in certain specified occupations, such as work in mines and smelters, brickyards, bakeries, street railways and railroads. In September, 1916, the United States Congress passed a law establishing an eight-hour day on all railroads engaged in interstate commerce, and this legislation was upheld in the Supreme Court in March, 1917. The minimum age for child workers gradually rose from eight to twelve, and now most states have set fourteen years as the limit. Sixteen and eighteen years are the minimum in a few instances for girls and for boys in certain dangerous trades and occupations, and in several instances nobody under twenty-one years of age may be employed. It is noteworthy that shorter working-days for men have been won not by legislation but chiefly through the power of organized labor (see LABOR ORGANIZATIONS).

Protection from Sickness and Injury. Laws to protect workmen from disease or accident apply particularly to factories, but also to mining and other industries. In most states laws have been passed to protect the worker from unsanitary surroundings; many laws require so many cubic feet of air space for each person employed and the installation of fans and devices to provide fresh air and to clear stagnant air of dust and odors. Adequate fire-escapes, outward-opening doors, guards and screens for dangerous machinery are other requirements. Until recent years many of these laws were passed without proper provision for their enforcement, but now there is some form of factory inspection nearly everywhere.

A notable change has taken place in the attitude of the law towards the employer's responsibility for the health and safety of his workmen. Time was, under the common law, when the employee could not win money damages from the employer unless he could prove that the latter was personally negligent. The modern theory assumes, on the contrary, that the employer is responsible, and usually requires him, even if he was not personally negligent, to contribute to the support of the injured workman. Further details are given in the article EMPLOYERS' LIABILITY (which see).

Restrictions on Laborers. So long as workmen made individual contracts with employers, it was the former who needed protection. With the growth of powerful labor organizations, however, there came the necessity of protecting not merely the employer but also the public, if the master and workmen have a dispute. Organized labor has been responsible for many of the laws protecting the workmen, but its power has also led to laws restricting its activities. W.F.Z.

Consult King's *Canadian Method of Preventing Strikes and Lockouts;* Hatch's *Government Industrial Arbitration* (Bulletin 60 of the United States Department of Labor).

LABOR ORGANIZATIONS, societies whose purpose is to improve the situation of laboring men and women, especially by securing increased wages, shorter hours of work and better working conditions. They are broadly of two kinds—the *trade unions,* whose members all have the same occupation, and the *associations,* which admit workers of every sort.

When the first unions were formed in England in the eighteenth century, factory laborers—men, women and even small children—were working more than twelve hours a day in dark and unsanitary shops for wages scarcely sufficient to keep them alive. Every workman was almost absolutely dependent upon his employer, but the latter could easily do without any individual employee. At first unions were prohibited by law, and the members were obliged to act in secret; but they soon made themselves feared, if not respected, by their employers, who were unable to treat an organized body of men as they had treated individuals. Powerful unions arose in nearly all the civilized countries, and largely as a result of their efforts the conditions of labor have been revolutionized. The article EIGHT-HOUR DAY explains one of the reforms obtained.

A frequent criticism of trade unions is that they have become as arbitrary on their part as they claim many of the employers to be. Thus they not only oppose the hiring of non-union labor, but one trade strictly confines

another trade to the latter's own business. For example, a bricklayer is forbidden to drive a nail, and a carpenter must not handle a trowel. Such narrow views are condemned by many of the labor organizations of the second type, those which include workers of all trades. The Knights of Labor, which in about the year 1885 was the strongest labor organization in America, is said to have declined in power because of its opposition to the unions, and leadership is now held by the American Federation of Labor, an association formed by hundreds of local trade unions in the United States and Canada.

The policy of the unions in demanding an equal wage for all, regardless of their comparative ability, is sometimes objected to on the ground that it gives no encouragement to conscientious and skilful work. On the other hand it seems plain that the receipt of good wages by comparatively inefficient workmen has enabled them so to improve their conditions of living that they and their children have become more efficient than were any laborers under former wage systems. It is well known that in many countries where uniform high wages are paid, manufacturing is really cheaper than elsewhere, both because of the increased value of the men and because of the stimulus to inventing labor-saving devices.

In England labor organizations became active after the law against them was repealed in 1824. The trade unions were responsible for many strikes accompanied by violence, and many workmen preferred to belong to socialistic societies. In 1864 an organization, called the International Workingmen's Association, was formed by French and British laboring men; it soon drifted into socialistic control, and eventually split into two rival societies. It opposed war and held the duty of a workman to his fellows to be above national allegiance. An international organization of today advocates the same principles, but proved to be powerless at the outbreak of the War of the Nations in 1914.

Workingmen's associations gained importance in the second quarter of the nineteenth century. The first large federation was the National Typographical Union, later called *International,* to include Canadian members. Since the decline of the Knights of Labor and the rise of the American Federation of Labor, the most important development has been the organization of the Industrial Workers of the World, familiarly called the "I. W. W.," a radical society objected to by the true leaders of labor, which demands the entire overthrow of the wage system and proclaims the right of workingmen to destroy employers' property, waste employers' time and break agreements at will. This policy is called *sabotage.* C.H.H.

Consult Lloyd's *A Country without Strikes;* Gilman's *Methods of Industrial Peace.*

Related Subjects. The following general articles and biographies of labor leaders have a bearing on this subject:

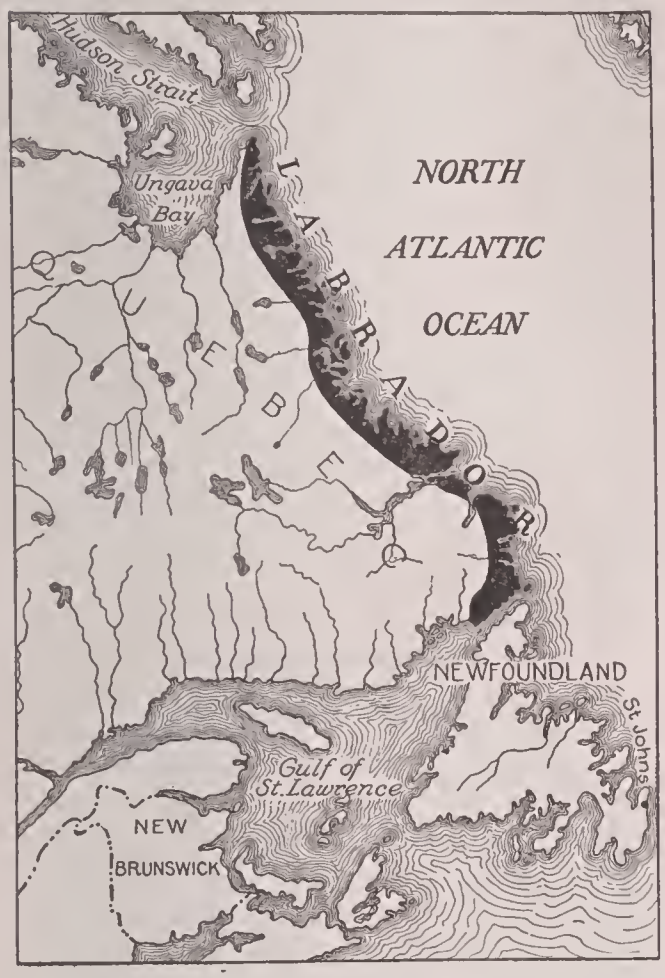
Debs, Eugene V.	Labor, Division of
Eight-Hour Day	Labor Legislation
Factory and Factory System	Mitchell, John
Gompers, Samuel	Open Shop
Knights of Labor	Sabotage
Labor Day	Strike
Labor, Department of	Syndicalism
	Wages

LABOUCHÉRE, *la boo shair',* HENRY DUPREY (1831-1912), a journalist and diplomat, born in Surrey, England. He excelled as a paragraph writer of pithy, pointed articles, and in Parliament, where he served over twenty years, he was famous for his pointed speeches, his aggressiveness as a Liberal, and his influence as a member of the Jameson Raid Commission in 1896. He was a member of the diplomatic service for ten years, serving at Washington, D. C., part of the time. He was connected with the *Daily News* as correspondent in Paris; was city editor of the *World,* and he founded and edited *Truth.* He was a vigorous advocate of Home Rule for Ireland.

LABRADOR, *lab ra dawr',* or *lab'ra dawr,* an almost trackless, icebound strip of rugged coastland, which, with its adjacent barren islands, constitutes the extreme eastern country of the British North American mainland. It is a dependency of the British colony of Newfoundland. Although Labrador was the first part of North America to be discovered by Europeans, having been visited by Norsemen in the tenth century, it is still a land of Eskimos and Indians; and although thousands of fishermen from Newfoundland, Canada and the United States visit its coast each year to carry away more than five million dollars worth of fish, little is known of the interior of Labrador with its untold wealth of natural resources.

Labrador extends from the Strait of Belle Isle northwest to Cape Chidley, at the entrance of Hudson Strait. It varies from ten to fifty miles in width and covers an area of 120,000 square miles, which is more than twice the area of the state of Georgia and almost half that of the great province of Saskatchewan.

The People and Their Surroundings. There are only about 4,000 people in Labrador, an average of one to every thirty square miles, but the population is concentrated in small,



LOCATION MAP

scattered settlements. In the barren north the people are chiefly Eskimos; in the south live Algonquian Indians, and here and there in the various settlements live a few whites. The homes of these fur-clad people are tents of skins or rude huts of stones or wood, often banked with snow and shaped like beehives. Although native dialects are still employed, English is generally spoken, and over one-third of the people belong to the Church of England. Many of the natives have been taught to read and write through the efforts of Moravian missionaries, who have stations at Nain, Okkak, Hopedale and Hebron. The Indians of the south are principally Roman Catholic. Through the heroic work of Wilfred Thomasen Grenfell, medical aid and a brighter future have been brought to Labrador's poor fisherfolk.

As the climate of the country is exceedingly cold and stormy at all times, excepting during a short summer season, the country is not adapted to agriculture. Moss and lichens are the principal forms of vegetation in the north; stunted growths of poplar, pine, birch and willow are found in the south. Fronting the Atlantic, Labrador presents a wall of rocky cliffs from 1,000 to 6,000 feet high, which are cut into numerous bays and fiords matching the Norway coast in beauty. The northern lights appear with brilliant frequency.

Labrador streams are rich in excellent food fish, which, with the cod and salmon fisheries of the coast, furnish summer occupations resulting in great wealth to Newfoundland. Valuable fur-bearing animals abound, and the trapping of silver, red and white foxes, marten, lynx, otter, mink, beaver and bears is the principal winter occupation. Caribou of the interior, and seals of the coast, are the principal sources of animal food to the inhabitants. Dogs and reindeer are the only domesticated animals, and both are used to draw sledges, the sole means of land conveyance. Canoes traverse the waters for hundreds of miles. Eagles, hawks, white grouse and numerous varieties of waterfowl are plentiful. Mosquitoes are as numerous and troublesome during their brief season in this land of almost continuous Arctic weather as in southern climates. The mineral resources of Labrador are practically untouched, but large deposits of iron and labradorite exist.

Government. Labrador is under the jurisdiction of the Newfoundland government, which is administered by a governor, assisted by an executive council, a legislative council and a house of assembly.

History. In the tenth century, Leif, the Norseman, discovered the Labrador coast, but no explorations were made. It was again discovered in 1497 by John Cabot. Explorations and settlements were made, and the name Labrador was given to the entire peninsula, which is now almost entirely a part of Canada's province of Quebec. It is believed that this peninsula was called Labrador because Portuguese explorers thought the natives would make good laborers, or slaves. Until 1840 the section was practically unexplored; then officers of the Hudson's Bay Company traversed the interior. The coast strip now constituting Labrador proper has changed ownership several times, and the exact boundaries were long disputed by Newfoundland and the Dominion of Canada. Continuous enmity exists between the Indians of the south and the Eskimos of the north. R.MC F.

Consult Grenfell's *Labrador, the Country and the People;* Dwight's *Children of Labrador.*

Related Subjects. The reader is referred to the following articles in these volumes:

Algonquian Indians	Eskimo
Aurora Borealis	Grenfell, Wilfred T.
Cabot, John	Newfoundland

LABRADOR CURRENT, a cold ocean current, flowing from the Arctic Ocean along the shores of Labrador to a point near Newfoundland, where it meets the Gulf Stream. The influence of so considerable a body of icy water

LABRADOR CURRENT

The downward-pointing arrows indicate the general course of the Labrador Current. The arrows pointing in a northeasterly direction show the course of the Gulf Stream.

is felt as far south as New England. The harbors of Labrador are blocked with ice for about half of each year, whereas those of the British Isles, situated in the same latitude, are open to commerce throughout the year. The difference is largely one of ocean currents, Great Britain being warmer because of the influence of the Gulf Stream. The Labrador Current is a considerable inconvenience to shipping. The cold current has a chilling effect on the air, condenses the moisture and gives rise to the heavy fogs off the shores of Labrador and Newfoundland—fogs through which ships have to feel their way with great caution to avoid collisions with other craft or with icebergs.

LABRADORITE, *lab ra dawr'ite,* or **LABRADOR SPAR,** so named from the region where it was discovered, is an ornamental stone used for decorative purposes because of its fine play of color—blue, green, orange, purple and red. The name is also applied to a species of fine building stone imported from Norway, and is used by some geologists as the name of a rock group containing much augite. Labradorite is generally dull gray in color but is susceptible of a fine polish. The comparatively-rare iridescent variety is much used in inlaid work.

LABRADOR TEA, a small evergreen plant belonging to the heath family, which grows in swamps in Greenland, Northern Europe and the northern part of North America. The leaves are tough, with a woolly brown covering on the underside, and when bruised are very fragrant. They are dried and used as a substitute for tea in Labrador, as suggested by the popular name of the plant. Botanists call it *ledum,* a word derived from the same root as *laudanum.* The leaves of the plant have narcotic properties and are sometimes used as a substitute for hops in the manufacture of beer. They also possess tannin, which makes them of value in the preparation of certain kinds of leather.

LABUR'NUM, an ornamental tree, of the pea family, prized on account of its bright yellow blossoms and glossy foliage, which remains green until late in the fall. It is sometimes called *bean trefoil tree,* or *golden-chain.* All parts of the tree, particularly the seeds, are poisonous, and insects never molest it. The English laburnum sometimes grows to a height of forty feet, but averages about twenty feet. In the United States it thrives as far north as Massachusetts. The large species yield a very fine-grained, hard wood, which can be polished and is used for turning, cabinet work, inlaying, etc. The poisonous substance contained in the seeds of the laburnum is called *cytisine.*

LABYRINTH, *lab'i rinth.* One of the best known of all legends is the story of Theseus, who with six other Greek youths and seven maidens was sent into the Cretan labyrinth to face the terrible minotaur. He killed the monster, but would have been unable to find his way out of the innumerable twisting passages of the labyrinth had not Ariadne given him a skein of thread to unwind as he entered. Until within the present generation it has been supposed that the story was entirely fanciful, and the idea of the labyrinth suggested by a cave on the mountain side near Cnossus, the ancient home of the Cretan kings. Now, however, the remarkable excavations conducted since 1900 by Sir Arthur Evans have established the probability that the legend is founded on events which actually took place. At Cnossus has been uncovered a marvelous palace truly labyrinthic in its intricacies. On its walls

are pictures of boys and girls, presumably captives trained in their art, vaulting onto the back of a charging bull, and beneath the palace have been found dungeons in which the toreadors may have been kept. On walls and pillars are frequent markings of a religious symbol shaped like a double axe and called *labrys;* undoubtedly the palace was the center of the worship which the labrys typifies, and so came to be called labyrinth.

The great labyrinth of Egypt, which Herodotus considered more marvelous than the Pyramids, was long ago torn to pieces, but its site can still be traced. It was perhaps built in emulation of the Cretan labyrinth.

A structure with an ingenious and confusing network of passages is often seen in amusement parks. A modern labyrinth of this nature is usually called a *maze;* it is designed to furnish amusement to those who like to try their skill at finding their way through a series of complicated, winding pathways. Games for boys and girls, based on the same principle, are also popular. The accompanying picture shows a type of English maze.

LABYRINTH, OR MAZE

A maze of the style once popular in English gardens. The walls were green hedges. By consistently following the right-hand or the left-hand wall a person could reach the center with comparative ease.

Related Subjects. The reader is referred to the following articles in these volumes:

Ariadne	Minos
Crete	Minotaur

LAC, *lak,* from which is obtained shellac, lacquer, lac dye and the finest grades of sealing wax, is made by insects. The lac industry is centered in Assam, Bengal and Siam. In the late spring the natives hang twigs containing the lac insect's larvae (young) in fig and other trees. Spreading to all the tender branches, the insects pierce the bark to get their food. From certain pores they give out a sticky red substance which fastens most of them to the tree. Beneath the bodies imprisoned in this lac the eggs hatch into countless larvae. Several generations thus succeed each other in one season, sometimes depositing lac half an inch deep. After six months the encrusted branches are cut off and the lac is prepared for commerce. Perhaps once in four years the trees are given a rest, for, though the insects make the lac, it is of course the trees which furnish the material.

Lac is prized by the Chinese because it can be highly polished (see Lacquer Ware). When purified it becomes *shellac,* which is valued for varnish because light penetrates it and shows the grain of the wood beneath. The best shellac is a light orange-brown; if all the impurities are not removed it is darker. Pulling and twisting makes it opaque, suitable for sealing wax. From the coloring matter which is strained out comes a beautiful purple dye.

LACCADIVE, *lak'a dive,* **ISLANDS,** a group of thirteen islands and coral reefs in the Indian Ocean, near the southwestern extremity of India, eight of which are inhabited. They are politically attached to British India and are populated by a Mohammedan race of mixed Arab and Hindu descent. The islands occupy an area of about eighty square miles, and lie so low in the sea that they would hardly be seen but for their cocoanut groves. The chief products are copra and cocoanut fiber, though in some parts, where the overlying coral has been removed, pulse, vegetables and bananas are grown.

The islanders are daring sailors; the commerce is conducted almost entirely in native boats, the surrounding reefs making navigation dangerous for ocean vessels. Rice, the principal food of the islanders, is imported. The women manufacture coir, from which matting is made (see Cocoanut), while the men devote themselves to boat building and trading with the mainland. The population is about 10,300.

The Laccadive Islands are in almost every respect similar to the Maldive group, farther south.

LACE, a delicate and ornamental network usually made of linen or cotton threads, but sometimes of silk. The word received its

present application in the sixteenth century; before this it was descriptive of the cord used to lace articles of clothing, and of gold and other fancy braids used for trimming. The most ancient specimens of lace in existence are the hair and breast nets found in Egyptian tombs, which date as far back as 2500 B.C. There are two distinct classes of hand-made lace, each of which contains many varieties; these are *needle-point* lace, and *bobbin,* or *pillow,* lace. A great deal of lace is now made by machinery, but this, of course, cannot be compared to the exquisitely designed and delicately beautiful hand-made varieties.

Needle-Point Lace. In the *needle-point process* a needle and a single thread are employed, and the work is developed mesh by mesh, each mesh being completed before the next is begun. Under this head are included Guipure, Venetian point, the French laces of Alençon and Argentan, Brussels Rose, Portuguese and Maltese point. Brussels point differs from the Venetian and French needle laces chiefly in the use of a plain instead of a button-hole stitch. Spanish point was at one time very popular, but the industry declined owing to the large quantities of Flemish lace imported into Spain. Specimens of this lace produced by Spanish convents in the early part of the nineteenth century were similar to Venetian point. Point d'Angleterre is another name for Flemish lace. In the oldest forms of point lace there was a foundation of fine linen, with a network of threads attached to a light frame, the patterns being worked with the button-hole stitch upon these threads and into the linen foundation. When the work was completed, the foundation was entirely hidden by the design. The foundation outside the pattern was then cut away, and the designs joined together by threads.

The Bobbin, or Pillow Process. This form of lace is said to have been invented in 1561. This variety of lace is made by working the design over a parchment pattern upon a cushion or pillow, the threads being wound upon bobbins. The figure is then made by looping the threads around the pins to form the open-work or net part of this form of lace. Among the more important bobbin laces are Brussels (both Saxony and Flemish), Mechlin, Lille, Chantilly, Valenciennes, Honiton and Irish lace. The Mechlin laces are made in Mechlin, Antwerp and Lierre. Ordinary Mechlin and Brussels pillow laces are made with a hexagonal mesh. The Lille laces are of a simple pattern, outlined by a thick thread. The Chantilly laces are also of simple construction, and are highly regarded, especially in black. Valenciennes was probably the most important pillow lace manufactured in Belgium prior to the German invasion in 1914, and that made at Ypres was of a particularly fine quality. Its chief characteristics are elegance of design, beauty of background and uniformity of tissue. The mesh, which is diamond-shaped and closely plaited, is without twisted sides.

Honiton is the best known and the most beautiful of the English pillow laces. It is, to some extent, similar to Brussels, but has more individuality. The beautiful Irish lace is made at Limerick, and is highly valued. The lace industry of Russia is said to have developed in the seventeenth century after a visit of Peter the Great to Paris, and the Russian varieties are therefore of French origin.

Machine-Made Laces. The various kinds of manufactured lace are largely made from cotton, although a fiber called *ramie* has been satisfactorily employed.

Nearly every kind of hand-made lace can be copied so perfectly that it is sometimes difficult to distinguish the imitations from the genuine. While the enormous output and cheapness of machine lace have brought it within reach of all classes, it is said that the demand for the hand-made varieties has not declined.

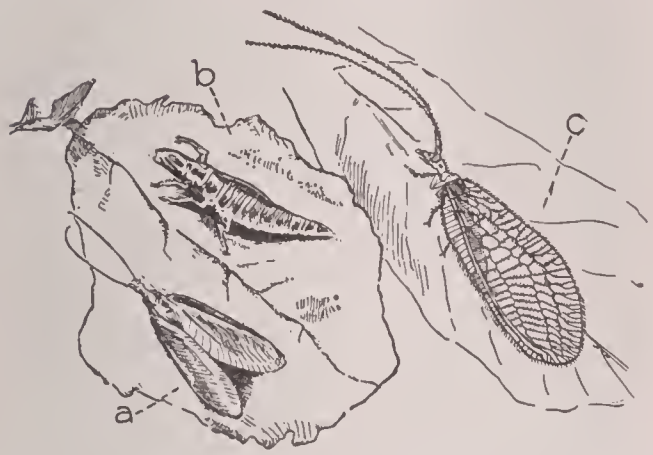
The first crude form of a lace machine was invented in 1758, and a lace was at once produced in imitation of Brussels. A really practical device was not brought out until 1809. This is said to have been suggested by machinery used in making fish nets. S.L.A.

Consult Jackson's *Hand-Made Lace;* Mincoff and Marriage's *Pillow Lace;* Jourdain's *Old Lace;* Clifford's *Lace Dictionary.*

LACE-BARK TREE, a curious tree for which the natives of the West Indies find various uses. The inner bark, made up of very strong fibers, consists of several layers, which after soaking may be easily separated into weblike sheets of "lace." This the women use for ornamental purposes, and it is said that Charles II of England was presented with a collar and frills made from it. Ropes, matting, whips and other articles are also made from the fiber and used largely in the Indies.

LACE-WINGED FLIES, a family of insects whose wings are lacelike, somewhat resembling gauze on an open-work frame. They have yellow-green bodies and feed upon smaller flies

and insect eggs. Their eggs are grouped as on a stem, to protect them from worms, and the larvae (young) spin themselves a queer



LACE-WINGED FLIES

(*a*) Adult, three-fourths natural size; (*b*) the grub, about one-half size; (*c*) the adult, magnified about one and one-fourth times.

little cocoon with a lid that opens to let them out when they become flies.

LACHINE, *lah sheen',* a suburb of Montreal, in Jacques Cartier County, Quebec. It is situated on the island of Montreal and on the Saint Lawrence River, eight miles southwest of Montreal, with which it is connected by the Lachine Canal. Lachine is the eastern terminus for steamers plying between Ottawa, Kingston, Toronto and Hamilton. Railway transportation is provided by the Grand Trunk and Canadian Pacific railways, and electric lines extend to Montreal. The name La Chine (China) was given the place in 1669, in derision of the first settlers, who had hoped to reach China by way of the Saint Lawrence River. In 1689 the place was burned and the inhabitants were massacred by the Iroquois Indians. It was rebuilt and incorporated as a town in 1872 and as a city in 1909. The population is chiefly Canadian. In 1911 it was 10,699; in 1916 it was estimated at 14,000.

Though primarily a residential suburb of Montreal, Lachine is also important commercially and industrially. Through the Lachine Canal, which was constructed to avoid the Lachine Rapids in the Saint Lawrence River, the city becomes the receiving and shipping point for all the water commerce between Montreal and the West. The enormous hydro-electric power generated here by the current of the Saint Lawrence River supplies Montreal and the vicinity with power for manufacture and other purposes. The largest industrial establishments in Lachine are electric light plants, steel mills, foundries, car- and boat-building plants and breweries. A.E.S.B.

LACHLAN, *lahk'lan,* a river in New South Wales, Australia, a tributary of the Murray, which with its branches forms the only large river system of the continent. It rises in the Blue Mountains, flows southwest into the Murrumbidgee, which joins the Murray, emptying into Encounter Bay. The Lachlan is about 700 miles long and furnishes moisture to the grassy plains through which it flows and on which great numbers of sheep are raised.

LACHRYMAL, *lak'ri mal,* **GLANDS** are the tear glands leading to the eyes. The phrase is from the Latin *lacrima,* meaning *tear,* and *glans,* meaning *acorn.* The glands are two small bodies each the size of an almond, lying in the upper and outer part of the cavities which hold the eyes. They secrete fluid which is carried to the eye by eight ducts which lead to the *conjunctiva,* or the thin, fine membrane that lines the lid and from there passes over the ball of the eye. The continual motion of the eyelid effects an unnoticeable washing of the eye, freeing it of dust and foreign bodies. This fluid next passes through two small openings in the lower lids into the lachrymal canals, and down the lachrymal ducts into the lower portion of the nose. An unusual secretion of moisture, on account of irritation of the eye or through excessive emotion, overflows the lower lid as tears. J.H.K.

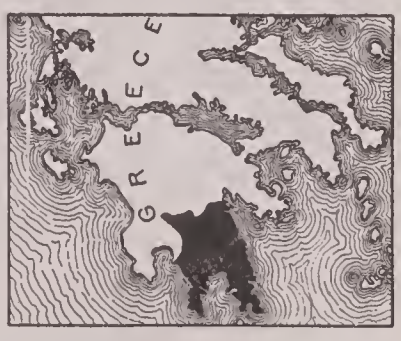
LACKAWANNA, *lak a wahn'a,* a small river rising in the northeastern part of Pennsylvania, in whose valley are found the largest and most important anthracite coal beds in the United States. It flows for about fifty miles through narrow defiles formed by the Shawnee and Moosie mountains, emptying into the north branch of the Susquehanna at Pittston. All along its banks are great rolling mills, collieries and blast furnaces.

LACKAWANNA, N. Y., a city in Erie County, noted for its steel industry. It is situated on the Lake Erie coast of the state, five miles south of Buffalo, by rail. Albany is 300 miles east, directly across the state, and New York is 450 miles southeast. The city is served by the New York Central, the Pennsylvania, the Lehigh Valley and the Buffalo, Rochester & Pittsburgh railways, and by traction lines. Lackawanna was incorporated in 1909, when it adopted the commission form of government. The inhabitants are chiefly Americans, with a mixture of Poles, Irish and Hungarians; the population increased from 14,549 in 1910 to 16,346 in 1915 (state census). The area of the city is four square miles.

Besides steel plants, which employ from 8,000 to 10,000 men, the city has extensive bridge works, coking plants and blast furnaces. The noteworthy buildings are those of Saint Joseph's Orphan Asylum, Saint John's Protectory, Moses Taylor Hospital, the city hall and the high school. South Park is a feature of interest. G.R.M.

LACOMBE, *la kohm',* a town in Alberta, in the south-central part of the province. It is on the Calgary-Edmonton branch of the Canadian Pacific Railway, eighty-one miles south of Edmonton, thirty-eight miles south of Wetaskiwin and 113 miles north of Calgary, and is also the western terminus of the Moose Jaw-Lacombe branch. Lacombe is the center of a rich agricultural district, a fact indicated by the grain elevators, flour mills, creamery and farm implement distributors, which are its chief commercial establishments. It has a Dominion experimental farm, and is the seat of Alberta Industrial College, with nearly 300 students. On Gull Lake, a popular summer resort eight miles north of Lacombe, are several hotels and many summer cottages. Population in 1911, 1,029; in 1916, about 1,800.

LACONIA, *la ko'ni a,* in ancient times the most important division of Southern Greece, or the Peloponnesus, famed as the country of the Spartans. It lay in the extreme southern part of the Peloponnesus, and was bounded on the west by Messenia and on the north by Arcadia and Argolis. Its eastern and southern shores were washed by the Mediterranean Sea. Through its central part extended the deep valley of the Eurotas River, which gave to this region the name "Hollow Lacedaemon." Sparta, capital city of Laconia, was situated in the western part. In the Homeric poems Laconia is described as the realm of Menelaus, husband of the beautiful Helen of Troy. For the history of the country, see the article SPARTA.



LACONIA

Modern Laconia is a political division of Greece, having a population of about 62,000.

LACONIA, N. H., the county seat of Belknap County, is a summer resort and manufacturing city in the mountainous lake region of the central part of the state. Mount Belknap, one of the White Mountains, is six miles distant. The city is built along both banks of the Winnepesaukee River between Lake Winnesquam to the southwest and Lake Winnepesaukee, northwest. Concord is twenty-seven miles south and west and Boston is 103 miles south. The city is served by two branches of the Boston & Maine Railroad and by an electric line to the Weirs, and is a port for pleasure boats and timber rafts on the lakes. The area of the city is fifteen square miles. The population, which is nearly fifty per cent French Canadian, was 10,183 in 1910 and 11,528 in 1916, by Federal estimate.

The cool climate, beautiful lake and mountain scenery and opportunities for fishing and boating attract many people in the summer. Opechee and several other small parks and an athletic field are places of interest. The public institutions include the Gale Memorial library, the state school for feeble-minded children and a home for the aged. The New Hampshire state fish hatchery is located here. The construction of a Federal building was begun in 1916.

Good water power has attracted a number of large manufactories. The Laconia Car Company employs nearly 1,200 men; the producing capacity is one passenger car a day and one freight car an hour. There is an extensive lumber business. More than 4,000 pairs of hosiery are produced daily by the city's hosiery mills. Other manufactured products are yarn, knitting machines, needles, sashes and blinds, axles, paper boxes and gas and gasoline engines.

A group of English people from the southern part of New Hampshire settled Laconia in 1780-1782. The place was incorporated in 1852 and chartered as a city in 1893. F.H.

LACQUER, *lak'er,* **WARE,** a beautiful product from the Far East, is made by application of many successive coats of a varnish called lacquer to any object from a match box to a bridge. In Japan *lacquer* is the sap of the *urushi* tree; in China and other countries it is generally *lac* (which see). The Japanese, who excel in the brilliancy, beauty of design and durability of their ware, learned the art from the Chinese, probably in the sixth century. A piece of Japanese lacquer ware has perhaps thirty-five thin coatings of black lacquer, each dried and highly polished before the application of the next, on a foundation of wood sometimes as thin as paper. The decorators draw their pictures with powders of

gold, silver and colors, and cover them with a protecting coat of transparent lacquer.

The best work is exceedingly artistic, and so durable that a lacquered door may be in daily use for centuries without deterioration. A collection of lacquer ware which had been exhibited at the Vienna exhibition of 1873 was recovered from a sunken ship; the ancient articles, more carefully made than the modern, were unharmed. Like painting, lacquer ware is often extremely valuable for its artistic excellence.

LACROSSE, *la kross',* the national game of Canada, taken over from the Indian tribes of the North. As originally played by the Indians it was a truly Homeric game; the warriors of two tribes contended in full war paint, and as many as 1,000 players are said to have participated.

Lacrosse as it is played to-day is not unlike football, the object being to carry or drive a small India rubber sphere between the enemy's goal posts. The *crosse,* with which the ball is driven or carried down the field, is formed of a pliable hickory staff bent into a hook at the top to serve as a frame for a network of rawhide or gut, not unlike a tennis racket but much longer. The goals are set up at a distance of from 100 to 150 yards apart, the goal posts being six feet high and the same distance apart. Each side, consisting of twelve players, struggles to send the ball through the enemy's goal posts as often as possible in the two periods of play. The ball itself may be kicked or driven with the crosse, but long drives are rather infrequent, the ball being advanced most commonly on the crosse and passed from player to player. Canada has a National Lacrosse Association, founded in 1867, and several colleges of the United States have organized a league of lacrosse clubs.

Books containing the rules of this game may be purchased at any stationer's shop for from ten to twenty-five cents. W.C.

LA CROSSE, Wis., an important manufacturing city, the center of a prosperous dairy and stock-raising section, and the county seat of La Crosse County. It is situated on the southwest border of the state, on the Mississippi River at the point where it receives the waters of the Black and La Crosse rivers. Five railway lines serve the city—the Chicago, Milwaukee & Saint Paul, the Chicago & North Western, the Chicago, Burlington & Quincy, the Green Bay & Western and the La Crosse & South Eastern. These with the river afford admirable transportation facilities. A fine wagon bridge spans the Mississippi. In 1910 the population was 30,417; it had increased to 31,677 in 1916 (Federal estimate). The area of the city is nine and one-half square miles.

La Crosse lies in a region along the Mississippi River noted for beautiful scenery; here the bluffs rise to a height of 600 feet above the river. The Black River, from the great forests of the north, mingles here with the "Father of Waters." The valley of the La Crosse River is an outlet for commerce to the east, and the Root River, which enters the Mississippi from the west, just below the city, makes the fertile sections of Lower Minnesota and Northern Iowa easily accessible.

La Crosse is an important tobacco market, and has a large wholesale trade; the annual output of its lumber mills is about 300,000,000 feet of sawed lumber. In addition, there are large rubber mills employing 625 people and making 13,000 pairs of shoes daily; pearl-button works, plow works, flour mills, gasoline-engine works, cracker factories, candy factories, knitting mills, garment factories and a great variety of other manufactories. The city also ships large quantities of seeds.

Among the notable buildings are a $100,000 Federal building, a state normal school which cost $250,000, a $200,000 high school, a $125,000 manual training school and a large public library containing 25,000 volumes, the gift of ex-Governor Washburn. A United States weather bureau and a United States fish station are located here. La Crosse is the see of a Roman Catholic archbishop. There are four parks, one of which, Pettibone Park, is on an island in the Mississippi River.

The site of La Crosse was visited by Father Hennepin as early as 1680, but a permanent settlement was not made until 1841. It was incorporated as a village in 1851 and as a city in 1856. A revised charter was granted in 1891. The site was known as Prairie La Crosse, from the Indian custom of meeting there to play the game of lacrosse. C.S.V.A.

LACTEALS, *lak'te alz* (from the Latin *lacteus,* meaning *milky*), is the name applied to numerous tiny vessels of the small intestines, whose function is to convey the milklike fluid called chyle (which see), during the process of digestion, to the blood. The lacteals originate in small projections of the mucous membrane of the intestines, the *villi,* each of which has its own lacteal vessel or network of vessels. The lacteals communicate with larger branches

located in the outer coats of the intestine, uniting finally to form large trunks which end in the *thoracic duct*. The latter tube runs upward close to the backbone and communicates with the left subclavian vein. Through this duct and the subclavian vein the nutritive food material contained in the chyle is carried from the lacteals into the general circulation. See THORACIC DUCT; DIGESTION. J.H.K.

LACTIC, *lak'tik,* **ACID,** from the Latin *lac,* meaning *milk,* is the name applied to several acids containing carbon, hydrogen and oxygen, the most important of which, ordinary lactic acid, is the characteristic ingredient of sour milk. It is this acid which is developed in cream when it is "ripened" in preparation for churning (see BUTTER). In a pure state it has the form of a transparent, colorless, syruplike liquid, and is a product of fermentation (which see). In the body it is found in the stomach and intestines and in the brain and muscles. A watery solution containing seventy-five per cent of lactic acid is a well-known drug, sometimes used in dissolving the membrane in cases of diphtheria, and in the treatment of stomach disorders. *Sarcolactic acid,* a substance having the same chemical composition as ordinary lactic acid, is found in the blood and is an important constituent of muscular tissue.

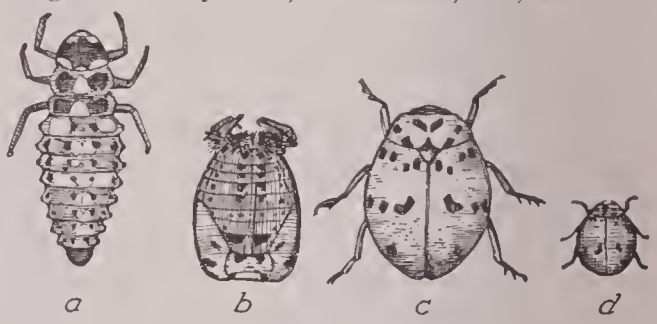
LADING, *laid'ing,* BILL OF. See BILL OF LADING.

LADOGA, *lah'doh ga,* Europe's largest lake, situated in Northwestern Russia, forty miles east of Petrograd. It is 7,000 square miles in area, or nearly one-fourth as large as Lake Superior. It is the terminal point of the system of waters which connects the Caspian Sea with the Gulf of Finland; this makes Lake Ladoga important from the standpoint of navigation. As it is dangerous for small craft on account of its rocks and shallows, several canals have been constructed along its southern and southeastern shores, upon which thousands of vessels sail each year. Its waters abound in fish. The chief towns upon its shores are Schlüsselburg, a celebrated fortress, and Novaya Ladoga, at the mouth of the Volkhov River.

LADRONE, *la drone',* **ISLANDS,** a group of sixteen islands in the North Pacific Ocean. They lie east of the Philippines and the Carolina Islands, and were discovered by Magellan in 1521, who named them Ladrones, the Spanish word meaning *robbers,* because of the thievish habits of the natives. In the seventeenth century Jesuit missionaries named them Mariana, in honor of the Queen of Spain, but the first name has been retained by geographers. Eight of the islands are inhabited, the bulk of the population being of Filipino extraction. The area of the entire group is about 420 square miles, one-third that of the state of Rhode Island. Rice, sugar, maize, coffee and tobacco are cultivated; breadfruit and cocoanut trees are native to the soil. There are few animals of any description on the islands. The climate is humid, but warm and healthful.

Guam, the largest of the islands, belongs to the United States; the others were sold by Spain to Germany in 1899. The population of the German group is less than 3,000. During the War of the Nations (which see) the Ladrone Islands were occupied by the Japanese. See GUAM.

LADYBIRD, *la'di bird,* the name applied to a large family of little beetles because of their shapely bodies and attractive coloring. These beetles are rounded or convex in form and often bright red or yellow, with black, red, white or yellow spots. The ladybirds feed chiefly on plant lice and scale insects, for the destruction of which they are highly regarded by fruit-growers.



THE LADYBIRD

(*a*) Larva; (*b*) pupa; (*c*) adult insect. These are much enlarged. (*d*) Full-grown ladybird, only slightly enlarged.

LADYSMITH, *la'di smith,* a town of Northern Natal, South Africa, the scene of a memorable siege during the South African War. It is the third largest town in the district, and is on the Klip River, at the junction of two railways, 322 miles southeast of Pretoria. Ladysmith was founded in 1851 and named after Lady Smith, wife of Sir Henry Smith, then governor of Cape Colony. In 1848 a party of Dutch farmers who had assembled for the purpose of driving across the Drakensberg Mountains had their camp on the site of the town and were induced by the governor to remain. The growth of the settlement increased with the opening of the railroad from Durban in 1886 and its subsequent extension to Johannesburg. In the Boer War, in 1899, Ladysmith was the

center of the struggle, 9,000 British troops under Sir George White sustaining a siege of 118 days, until relieved by General Buller on February 28, 1900. The town has railway shops, electric lights, schools and churches. It is the capital of the district of Ladysmith. Population, 1911, 5,340.

LADYSMITH, a city in British Columbia, on the east shore of Vancouver Island. It is on the Esquimalt & Nanaimo Railway (now part of the Canadian Pacific system), fifty-eight miles northwest of Victoria and fourteen miles south of Nanaimo. The Canadian Pacific operates a ferry for freight trains between Vancouver, on the mainland, and Ladysmith. A large copper smelter, shingle mill, boat-building plant and aërated water works are the principal industrial establishments. Oyster cultivation is an important pursuit, and there are large coal mines near by. Ladysmith has had a rapid growth since 1901, when its population was only 700; in 1911 it was 3,295, and in 1916 about 3,800.

LADY'S SLIPPER, a group of beautiful plants belonging to the orchid family, whose name has been given them because of the large, inflated lip of the corolla, which bears a curious resemblance to a slipper. They are found throughout the temperate regions of the world, except in Africa and Australia. About ten species have been identified in North America. Among these are the *moccasin flower,* or *pink lady's slipper,* the *yellow moccasin flower,* and the *showy lady's slipper,* whose inflated white lip is marked with purplish pink or crimson stripes. See ORCHID.

THE LADY'S SLIPPER

LA FARGE, *la fahrzh',* JOHN (1835-1910), an American painter who worked with equal success in oil, water colors, on wood and on glass. His subjects included flowers, religious themes, portraits and landscapes. He was born in New York City and studied in Paris. After the completion of the mural decorations for Trinity Church, Boston, he turned his attention to glass-painting and window-designing. Together with Saint Gaudens he designed the King sepulchral monument at Newport, R. I. He executed glass church windows and decorated many churches in various large American cities. A notable example of his work in mural decoration may be seen in the Minnesota State Capitol, Saint Paul.

His finest work is the large altarpiece in the Church of the Ascension, New York City, executed in 1887. *The Arrival of the Magi* is one of his best-known paintings. His trip to Japan and the islands of the Pacific Ocean resulted in the completion of innumerable water-color sketches of native life and scenes. La Farge wrote many valuable articles on art for the leading periodicals. His greatest contributions to art outside of his mural paintings were his successful experiments in glass-cutting, painting and designing. In certain phases of this work he has not been surpassed.

LAFAYETTE, *lah fa yet',* IND., the county seat of Tippecanoe County, seventy-four miles by rail northwest of Indianapolis, in the northwestern part of the state. It is on the Wabash River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Lake Erie & Western, the Chicago, Indianapolis & Louisville and the Wabash railroads. The city has electric interurban service. In 1910 the population was 20,018; in 1916 it was 21,286 (Federal estimate). The area of the city is six and one-half square miles.

Lafayette is in the valley of the Wabash River, somewhat below the level of the surrounding plains. It is the seat of Purdue University (which see), and has a county courthouse, city hall, public library, high school, Wabash Valley Sanitarium (Seventh Day Adventist), Saint Elizabeth and Home hospitals, Saint Joseph's Orphan Asylum and the Indiana State Soldiers' Home, which provides also for the wives and widows of soldiers.

Lafayette is the market for a rich surrounding agricultural country. It has an important horse market, pork-packing plants, foundries and machine shops, and manufactories of soap, flour, paper, strawboard, cardboard, wagons and farming implements, automobile accessories and electric meters and transformers.

The present city is five miles northeast of the site of the old Miami Indian village, Oniatanon, where the French built a fort in 1720. This was probably the first military post established in Indiana. About seven miles north of the city the Indians were defeated by General Harrison in the famous Battle of Tippecanoe. The battleground is marked by a fine granite shaft, and is now the property of the state. Lafayette was settled in 1820, and was incorporated in 1854.

LAFAYETTE, Marie Jean Paul Yves Roch Gilbert du Motier, Marquis de (1757-1834), a famous French soldier and statesman, who holds in the affections of the American people a place as high as do the heroes of their own country. He was born in the castle of Chavagnac, in Auvergne, September 6, 1757, and was left an orphan in possession of large estates, when but thirteen years of age. When seventeen years old he married and entered the army, and three years later, fired by youthful enthusiasm for the new republic proclaimed in America, set out with eleven companions in a ship fitted out by himself, to offer his services to the colonists.

MARQUIS DE LAFAYETTE

A Youthful Major-General. He was at once made a major-general in the American Revolutionary army, and in spite of his youth, soon became one of the most efficient members of Washington's staff. At no time did he command a large force, but in every position in which he was placed he showed great courage and developed unusual military skill. At Brandywine, at Barren Hill and under Lee at Monmouth (see Monmouth, Battle of) he won well-deserved praise, but in 1779 felt compelled to return to France, for against his own country England had declared war.

After performing notable service at home for the colonists by enlisting French sympathy, securing reënforcements of soldiers and financial assistance, he returned in May, 1780, to America. He was a member of the court of officers who tried Major Andre (see Andre, John) and condemned him to death. His most distinguished military service was against Benedict Arnold in Virginia in 1781, and in the campaigns against Cornwallis, which led up to the decisive battle of Yorktown. For his part in the victory of Yorktown, which practically decided the war, he received the public thanks of his great commander-in-chief. See Revolutionary War in America.

Later Visits to America. Lafayette revisited America twice, in 1784 and again in 1824-1825, and both times was received with the most cordial enthusiasm and affection. The latter visit was, in fact, in the nature of a triumphal progress, for Lafayette's firm support of democratic principles in France had increased the esteem in which he was held in America. Congress voted him a grant of $200,000 and a township of land in Florida. He was sent home on a new vessel named the *Brandywine,* in memory of the first battle in which he distinguished himself in America. During the years that have since passed twenty-three cities and towns in the United States, besides many counties, have been named in his honor.

A Reformer at Home. On his return to France in 1782 Lafayette at once showed his desire for reform. In 1787 he was called to the Assembly of Notables, and he took a prominent part in the calling of the States-General and its transformation into the National Assembly. In that body he presented a declaration of rights based on the Declaration of Independence of the American colonies. After the Bastille (which see) had fallen he was made commander-in-chief of the National Guard, which he did much to organize on an efficient basis. It was he who proposed the tricolor cockade, and he who saved the lives of the king and queen, Louis XVI and Marie Antoinette, at the time of the attack on Versailles. See French Revolution.

Influence Lost and Regained. But the period of his great influence was passing, for he managed to satisfy neither party. His demand for order and moderation angered the radicals; his republican zeal won him the hatred of the Royalist party, and at times his life was in danger. When war was declared against Austria and Prussia he was placed in command of an army on the frontier, but in August, 1792, the Jacobins (which see) sent messengers to remove him from his command and arrest him. Escaping from these, he fell into the hands of the Austrians, who held him prisoner for five years. Napoleon Bonaparte (see Napoleon I) procured his release, but Lafayette did not favor the ambitions of the

first consul, during whose period of rule he lived in retirement.

In 1815, when Napoleon was sent to Saint Helena, the monarchy was restored and Lafayette took his place in the Chamber of Deputies, where he was always on the side of the Liberalists. The revolution of 1830 enlisted his sympathy; he was one of its chief promoters and acted again as commander-in-chief of the National Guard.

Estimate of His Character. Lafayette is one of the popular heroes for whom no apologies are needed, for in all his long public life he said and did nothing which could stain his reputation. Brave, disinterested in his motives, devoted to liberal ideals to the point of sacrificing his fortune to them, he escaped even the unjust reproach which so many good men have been forced to bear. A.MC C.

Consult Tower's *The Marquis de Lafayette in the American Revolution;* Tuckerman's *Life of Lafayette.* Women readers will be interested, also, in Crawford's *The Wife of Lafayette.*

LA FOLLETTE, *la fol'et,* Robert Marion (1855-), an American political leader, one of the most conspicuous figures in the group of men who have fought for political progress in government in the United States. In Wisconsin, his native state, he led the fight for reform, and made the words "Wisconsin" and "progress" almost synonymous. In the United States Senate, of which he has been a member since 1905, he has been of the determined few who have refused to be bound by party traditions and have acted and spoken as they thought best. A favorite remark of his indicates his aims: "The great issue before the American people to-day is the control of their government." La Follette is a difficult man to swerve from any purpose; once his mind is made up, he fights for his opinions with a frankness and a vigor which earned for him years ago the nickname "Battling Bob."

ROBERT M. LA FOLLETTE
One of the leaders in the American Congress, with much "advanced" legislation to his credit.

He was born at Primrose, Wis., and was left fatherless when only a few months old. As a boy and young man he bore the burden of supporting his family, and at the same time succeeded in earning enough to pay for his own education, and he was graduated from the University of Wisconsin in 1879. In the year following he was admitted to the bar, at once opened his own office, and before the end of the year had been elected district attorney of Dane County. His success was due partly to a personal canvass of his district, and partly to his skill in raising a distinct issue for his campaign.

After four years as district attorney he was elected to the national House of Representatives. When he took his seat in 1885 he was the youngest member of the House, but he soon won recognition, not only as a speaker but as a hard worker on committees. He served in the House for six years, and during his last term, as a member of the Committee on Ways and Means, had an important part in framing the McKinley Bill of 1890, a high-protective tariff measure.

At the election of 1890 La Follette's constituents showed their disapproval of his activities by defeating him. Then for ten years he practiced law at Madison, but continued to take an active part in Republican politics. About the year 1895 he was becoming recognized as the leader of a group of Republicans who were in revolt against existing political conditions as shown in local state rule. Against those controlling affairs La Follette took up the fight with characteristic vigor. His ideas on reform were outlined in two pamphlets written in 1897—one called *The Menace of the Machine;* the other, *The Nomination of Candidates by Australian Ballot.* La Follette's followers were called the "Half-Breeds;" the opposing Republicans were the "Stalwarts." Finally, in 1900, the "Half-Breeds" succeeded in electing La Follette as governor.

His inauguration was the beginning of an era of progress which made Wisconsin for more than a decade the model for political reform. Most of the "advanced" legislation was urged by La Follette, and was literally forced upon his opponents. Direct primaries, equalization of taxation, control of railroad rates and publicity for campaign expenditures are a few examples of the reforms he achieved. He was twice reëlected, but at the beginning of his third term, in January, 1905, he resigned the governorship to become United States Senator, an office to which he was reëlected in 1911 and in 1917.

In spreading his ideas and urging others to adopt them La Follette has used every legitimate means at his command. He has been a frequent speaker and has reached multitudes through his Chautauqua addresses. In 1909 he established a paper, *La Follette's Weekly,* which existed for several years. His prominence in Congress and before the people led to frequent mention of his name as the Republican candidate for President in 1908; in 1912 he was defeated for the nomination by President Taft, and in 1916 by Charles Evans Hughes.

When war with Germany was debated in the United States Senate in March, 1917, previous to formal declaration of hostilities, La Follette was the leader of a small group of Senators who attempted to defeat the government's war program. W.F.Z.

LA FONTAINE, *la fawN ten'*, JEAN DE (1621-1695), one of the greatest of the poets of France. He is universally known through his *Fables,* which appeared in 1668 and went through within a few years a great many editions. In 1654 he published an adaptation of the *Eunuchus* of Terence; in 1664 his *Tales* appeared, and in 1668 his *Fables* were published. He was unambitious, absent-minded, and always ready to accept the hospitality which was offered so freely in the provincial towns of France in his day. He made a great many influential friends through his verses, and they provided for him during his sojourn in Paris. He was much beloved by Molière, Boileau and Racine for his simplicity and candor and enjoyed the friendship of many clever men of Paris. He was greatly disliked by Louis XIV, however, who confirmed his nomination to the French Academy with reluctance.

LAFONTAINE, SIR LOUIS HIPPOLYTE (1807-1864), a Canadian jurist and statesman, whose name will always be linked with that of Robert Baldwin in the struggle for responsible government. Lafontaine in Lower Canada and Baldwin in the upper province bore the brunt of the struggle, and their second ministry, formed in 1848, was the first to be acknowledged responsible to a majority of the assembly. Lafontaine was a statesman of more than ordinary vision, and he ranks high among the men who laid the foundations of the Dominion. He was not eloquent as a speaker, and he spoke English, though correctly, with a pronounced French accent. Yet his keen logic and even temper enabled him to overcome in debate many a more gifted speaker.

Lafontaine was born at Boucherville, Lower Canada. Like most of the aristocrats of his day, he studied law, and practiced with such success that he was soon financially independent and able to give his entire time to public affairs. In 1830 he was returned to the Lower Canada assembly. At first a follower of Papineau, he soon became the latter's rival, and eventually succeeded him as leader of the French party. In 1838 charges of treason were made against him as an accomplice in the rebellion of 1837. The charges were baseless, the only evidence against him being an ironical letter on the absurdity of revolution. Though not convicted he withdrew to England, and later to France.

SIR LOUIS LAFONTAINE

Returning to Canada, Lafontaine was at once elected to the joint assembly after the Act of Union. As the leader of the French-Canadians he joined Robert Baldwin (which see) in forming a ministry in 1842 and again in 1848. This second ministry marks the beginning of responsible government in Canada. By nature an aristocrat and a Conservative, Lafontaine gradually drew away from the younger and more radical reformers led by George Brown, and in 1851 retired from political life. Two years later he was appointed Chief Justice for Lower Canada, a post which he filled with distinction until his death, which occurred at Montreal, on February 26, 1864. The baronetcy, which had been conferred on him in 1854, became extinct at his death.

LAGERLÖF, *lah'ger luf,* [OTTILIA LOVISA] SELMA (1858-), a Swedish novelist, and the first woman to be elected a member of the Swedish Academy, was born on the family estate in Wermland, Sweden. She was educated at Stockholm and following her graduation taught school for ten years. While she was still teaching she wrote her first novel, *The Story of Gösta Berling.* This book met with an immediate and brilliant success, and marked the decline of the morbid pessimism which had been the literary vogue in Sweden. The *Miracles of Anti-Christ,* a record of the author's travel in Italy, was published in 1897, and was even more popular than her first work. Com-

missioned in 1902 by the National Teachers' Association of Sweden to write a school textbook which would present in narrative form the folklore and geographical conditions of Sweden, Miss Lagerlöf produced *The Wonderful Adventures of Nils,* a children's classic. Her other writings include *From a Swedish Homestead, Invisible Links* and *The Girl From the Marsh Croft.* In 1909 Miss Lagerlöf received the Nobel prize in literature (see NOBEL PRIZES), due largely to the recognition given *The Story of Gösta Berling.* In 1915 she published *Jerusalem,* a pen picture of the Dalesman of the north country. Her popularity in America is partially due to the painstaking translations by Mrs. Velma Swanton Howard.

SELMA LAGERLÖF
One of the three leading women novelists of the twentieth century, sharing this distinction with Mrs. Humphrey Ward and Mrs. Edith Wharton.

LAGOON', from the Latin *lacuna,* meaning a *gap,* or *hollow,* is the name applied to a shallow body of water at the mouth of a river or between sand reefs and the mainland along sea and lake coasts. Occasionally the marshes formed by the gradual filling of such places with sand are called lagoons, but such use of the word is incorrect. The still water enclosed within an atoll, or coral island composed of reefs which form an irregular circle, is also called a lagoon, and the meaning has been extended to include artificial lakes and canals in parks. The city of Venice is built upon numerous small islands in a large lagoon between the mouths of the Piave and Po rivers.

LA GUAYRA, *la gwi'ra,* a South American seaport on the north coast of Venezuela, one of the leading commercial cities of the country. It is situated on a narrow strip of land between high mountains and the Caribbean Sea, and is five miles from Carácas, the capital of Venezuela. With this city it is connected by a mountain railroad, and it enjoys steamship communication with America and Europe. The manufactures of La Guayra—hats, shoes, cigars and cigarettes—are chiefly for domestic use; skins, coffee and cacao are the principal exports. Sanitary improvements have made the city a more desirable residence place than it was formerly, with its hot, unhealthful climate, and the population is now more than 12,000. A fort protects the harbor where a breakwater has recently been built, and the city proper boasts of several churches and hospitals. In the public square stands a statue of Vargas, a famous physician born in La Guayra. The city is the terminus of a cable to Curaçao and the seat of a United States consul.

LAHORE, *lah hohr',* the largest city of the Punjab, a province in the northwestern part of British India. Lahore is the capital of the province and of the division and of the district also called Lahore. It lies on the west bank of the Ravi River, at the meeting point of several railroads. The native town covers an area of one square mile and is surrounded by a brick wall fifteen feet high. Its appearance is far from pleasant, as the streets are exceedingly narrow, unpaved and dirty; its houses are of irregular construction, but many are rendered attractive by projecting balconies and lattice windows ornamented with varieties of carved woodwork. The sordid aspect of the city is relieved by a magnificent mosque, a mausoleum, and a royal palace dating from the early Mogul period. The European quarter, which lies outside the walls on the south, dates from 1849.

Lahore has direct railroad connection with Delhi, Calcutta and Bombay. Coarse silks, cotton prints, carpets, vegetable oils and candles are important articles of manufacture. The Punjab University, one of the most popular educational institutions in India, is the most important of several schools. Population, 1911, 228,680. It is not as attractive as many other cities of India.

LAKE, a body of water surrounded by land. The distinction between a lake and a pond is not clear. A pond is a small body of water not large enough to be dignified by the name of lake, but how large a pond must be before it is a lake is a matter of opinion. The word appears to be derived from the Greek *lakkos,* meaning a *hole, pond* or *lake.* Scientists agree that no matter what the cause of the formation of a lake it is formed but to perish, and the life of a lake, speaking in geological terms, is limited. It may be destroyed by a change of climate, by volcanic action which changes the contour of the country, or it may shrink by apparent evaporation. Lakes which have a river outlet are destined to find that the river has gradually worn away the barrier which holds the lake waters in place.

Lakes may be caused by natural collection of water in extinct volcanoes, by rivers which deposit silt until the natural outlet to the sea is closed, by subsidence of portions of the earth, by the melting of the ice in the Glacial Period (which see) or by many other causes. They occur in all parts of the world, but are more frequent in high than in low latitudes.

Some lakes are at a considerable elevation above sea level, while others, as in the case of the Dead Sea, are many feet below that level. Lake Titicaca, in the midst of volcanic territory in South America, is 12,500 feet above the sea; the Dead Sea is 1,292 feet below sea level. Many basins of lakes have been scoured out of the rocks by glaciers. In Minnesota alone it is estimated that there are nearly 10,000 lakes due to glacial action, and Cayuga Lake (which see) in New York is another striking example of glacial scouring. In addition to the numerous lakes found in all parts of the world, there are equally numerous basins in which lakes once existed. The lakes that now exist will in time vanish, leaving basins that will be rich for cultivation.

The Great Lakes (which see) have been formed partly by glacial action and partly by the filling of river beds, causing the dammed-up waters to overflow into the surrounding valleys. Some lakes are basins in which water has accumulated, fed by rivers and mountain streams, with the surplus waters drained off by other rivers; others apparently have neither inlet nor outlet. In contrast, others have streams which bring a continual supply of water, but which have no outlet. The Great Salt Lake is a striking example of this.

Effect Upon Temperature. The presence of a large body of water, such as any one of the Great Lakes, materially modifies the weather conditions for several miles in every direction. No matter how cold the weather may become over a wide area, residents of such a lake district do not suffer from temperatures as low as do their neighbors twenty miles inland. Water practically gets no colder than 32° F., the freezing point; it therefore warms the colder surrounding air from 5° to as much as 15°. In summer a large body of water never gets as warm as the surrounding atmosphere, therefore it cools the air perceptibly.

Conditions of agriculture near large bodies of water are materially changed. The great fruit belt of Michigan is along the east shore of Lake Michigan, where the influence of the winds from over the water so modify an otherwise rigorous climate that small fruits flourish. This great fruit belt is a comparatively narrow strip along the shore extending from the southern point of the lake in Indiana northward for over 200 miles. The grape and tobacco belt in New York lies along the shores of Lake Erie and Lake Ontario, and the presence of these large bodies of water has made it possible to raise fruits of many kinds on the other shore, in Southern Ontario, where the climate would naturally be too severe. W.F.Z.

Consult Russell's *Lakes of North America;* Gilbert's *Topographic Features of Lake Shores,* in United States Geological Survey, Fifth Annual Report.

Related Subjects. The following lakes are treated in their proper alphabetical order in these volumes:

AFRICA

Albert Edward Nyanza
Albert Nyanza
Chad
Nyassa
Tanganyika
Victoria Nyanza

ASIA

Aral
Baikal
Balkash
Caspian Sea
Dead Sea
Galilee, Sea of

CANADA

Athabasca
Bras d'Or
Champlain
Erie
Great Bear
Great Lakes, The
Great Slave
Huron
Lake of the Woods
Louise
Manitoba
Memphremagog
Muskoka Lakes
Nipigon
Nipissing
Ontario
Rainy
Saint Clair
Simcoe
Superior
Winnipeg

CENTRAL AMERICA

Nicaragua

EUROPE

Avernus
Caspian Sea
Como
Constance
Geneva
Katrine
Killarney
Ladoga
Lomond, Loch
Lucerne, Lake of
Lugano
Maggiore,
Neuchâtel (subhead)
Onega
Zurich

SOUTH AMERICA

Maracaibo
Titicaca

UNITED STATES

Cayuga
Champlain
Erie
George
Great Lakes, The
Great Salt Lake
Huron
Lake of the Woods
Memphremagog
Michigan
Moosehead
Okechobee
Oneida
Ontario
Pontchartrain
Rainy
Saint Clair
Salton Sea
Seneca
Superior
Tahoe
Utah

LAKE CHARLES, La., the parish seat of Calcasieu Parish, is a city in the southwestern corner of the state, forty miles from the Texas state line and thirty miles from the Gulf of Mexico. New Orleans is 218 miles east, and Houston is 160 miles west and south. Lake Charles is one of the most attractive cities in the state and is a popular winter resort; it is situated on a lake of the same name, and on the Calcasieu River. By way of the Intercoastal Canal, the city has deep-water communication, and a project is under way to deepen the river, making it navigable through the lake to the Gulf of Mexico. It is served by the Southern Pacific, the Kansas City & Southern, the Saint Louis, Iron Mountain & Southern, and the Lake Charles & Northern railroads. The area is four and a half square miles. The population in 1910 was 11,449; in 1916 it was 14,447 (Federal estimate).

A Federal building, completed in 1912 at a cost of $200,000, the parish courthouse, which cost $75,000, the city hall, Masonic Temple, the Roman Catholic church and convent, Yacht and Country Club, Carnegie Library and a private sanitarium are prominent buildings.

North of the city are large forests of valuable timber, long-leaf pine, oak, ash, magnolia, cypress and other varieties. Ten miles west are extensive sulphur mines, which, with the sulphur mines of Sicily, produce the greater part of the world's supply of that commodity. The surrounding country is the largest rice-producing section in the United States. Oranges, grapefruit and all kinds of garden vegetables are sent to city markets. The industrial enterprises of the city, whose aggregate weekly pay roll is $200,000, include eight huge saw mills, rice mills, fence factories, brick plants, a shipbuilding plant and an ice factory.

Lake Charles was settled about 1852, and in 1857 was incorporated under the name Charleston. Under the name of Lake Charles it was again incorporated in 1867 and chartered as a city in 1886. The commission form of government was adopted in 1913, providing for three commissioners. H.B.B.

LAKE DWELLINGS, habitations placed on platforms supported by piles or other foundations, within the margins of lakes or creeks at some distance from the shore. The name is generally applied to the prehistoric dwellings of which numerous remains have been found in the lakes of Switzerland and other parts of Southern Europe. These remains first became known to archaeologists in 1853 and 1854, when the discoveries were made in a lake near Zurich, although mention of a lake-dwelling community in Macedonia occurs in the writings of Herodotus, a historian of the fourth century B. C.

Discoveries led to the belief that some of these curious villages were constructed during the Stone Age (which see); that others were built after iron came into general use, and that about 4,000 years must have elapsed between the building of the first and the last of those now unearthed. Remains of various grains and some fruits, as well as bits of pottery, have been found. In Scotland and Ireland, where such communities also were numerous, they are known as Crannogs, from the Celtic word *crann,* meaning a tree. The latter, however, were not constructed like the Swiss pile villages, but were generally artificial islets formed of brushwood, stones and earth and steadied by piles driven through and around the mass.

The first traces in North America of anything resembling the lake dwellings of Europe are at the mouth of Naaman's Creek, a tributary of the Delaware. The custom of living in wooden houses erected on piles over the waters of a lake or inlet of the sea is still practiced by barbarous tribes in the Malayan Archipelago, New Guinea, Venezuela and in Central Africa; in fact, the name Venezuela (little Venice) was given because of the prevalence of these pile-dwellings along its shores.

LAKE OF THE WOODS, a body of water lying on the boundary between the United States and Canada. The greater part of its surface, which is estimated at 2,000 square miles, lies in Western Ontario; about one-quarter is in Minnesota, and sixty square miles, comprising two small bays, are in Manitoba. The lake is about sixty-five miles long, from ten to fifty miles wide, and about 300 miles in circumference. It is famous in history as the location of some of the first trading posts in the West, and also as an important factor in several boundary disputes between the United States and Great Britain. According to the treaty which ended the Revolutionary War the boundary was to run from the northwest angle of the lake "on a due course west to the river Mississippi." The later discovery of the Mississippi's source 100 miles south was naturally followed by disputes, but the present boundary was fixed by the Convention of London in 1818.

The hilly shores and the dozens of islands are covered with the forests which have given

the lake its name. Lumbering is naturally the principal occupation of the region, and there are large mills at Kenora and other points on the lake. Fishing is also important as an industry and as a sport, and the lake is now perhaps best known as a summer resort. Railways run along the northern and southern shores, and in summer there are excursion

LOCATION MAP

steamers which ply up and down the lake, and go east on Rainy River as far as Fort Frances. The Winnipeg River issues from Lake of the Woods at its northern end.

LAKES, in painting, are pigments, or colors, formed by separating animal or vegetable coloring matters from their solutions, chiefly with oxide of tin or alumina. The name is taken from *lac,* the substance from which they were originally prepared. The cochineal and madder lakes are used only by artists. Cochineal pigments—carmine, crimson lake, scarlet lake, purple lake and Florentine lake—do not possess the permanency of the madder lakes and are used particularly in flower painting. The madder pigments, called rose madder or madder lake and madder carmine, are of great value both as oil and water colors. See Cochineal; Lac.

LAKES, Great. See Great Lakes, The.

LAKE SCHOOL, or **LAKE POETS,** as Wordsworth, Coleridge and Southey were called, were so named by the *Edinburgh Review* because they chose to live in the lake district of Cumberland and Westmoreland. Their only characteristic in common was a dislike of the stiffness of the prevailing classicism and a determination to cultivate a simple and natural school of poetry. They wrote at the beginning of the nineteenth century, which was sometimes called the second age of English verse.

LAKEWOOD, Ohio, in Cuyahoga County, is a residential suburb called the "City of Beautiful Homes," four miles west of Cleveland, on the shore of Lake Erie. Lake Avenue, the principal thoroughfare, is lined by the handsome residences of Cleveland business men. The city has a Masonic Temple, Carnegie Library, Lakewood Hospital and a number of beautiful church buildings. There are a few manufacturing plants in the eastern part of the city. The area is nearly six square miles. The population in 1910 was 15,181; in 1916 it was 22,615 (Federal estimate).

LAMAISM, *lah'ma iz'm,* an offshoot from Buddhism, so called from its *lamas,* or priests. This cult had its origin in the seventh century A. D., and is yet professed by the Tartar tribes of Tibet, Mongolia and Manchuria. Buddha is worshiped as the founder of the religion and is supposed to be embodied in the two priestly leaders, *Dalai-Lama* and *Tensh-Lama.* The former is the more powerful of the two by reason of his larger territorial possessions, and is the recognized head of the Buddhists inhabiting Tibet, Mongolia and China. See Buddhism.

LAMAR, *la mahr',* Lucius Quintus Cincinnatus (1825-1893), an American statesman and orator, born in Eatonton, Ga., educated at Emory College (Oxford, Ga.) and admitted to the bar in 1847. After a short residence in Mississippi, Lamar returned to Georgia and was elected to the legislature in 1855. Again in Mississippi, he was twice made Congressman. In 1861 he resigned to become lieutenant-colonel in the Confederate army. Lamar drafted the secession ordinance for Mississippi. At the close of the war he was elected to Congress, holding a seat in the Senate from 1877 to 1885, and from 1885 to 1888 was Secretary of the Interior in the cabinet of President Cleveland. After 1888 he was Associate Justice of the United States Supreme Court, by appointment by President Cleveland. He vigorously opposed the inflation or debasement of the national currency, and for stating his opinions, while a member of the Senate, was asked by the Mississippi legislature to change his views or resign. Refusing to do either, Lamar submitted his case to the people, who enthusiastically upheld him.

LAMARCK, *la mark',* Jean Baptiste Pierre Antoine de Monet de (1744-1829), a French naturalist, renowned for his researches in botany, zoölogy and meteorology. He wanted to be a soldier, but his parents sent him to the Jesuit College at Amiens. Upon his father's death in 1760 Jean enlisted in the army during the Seven Years' War, but an accident made it necessary for him to abandon military life, and he went to Paris. There for many years he engaged in botanical work, meeting with such success that he was called "the French Linnaeus," after the famous Swedish botanist of that name. In 1793 the Museum of Natural History made him professor of the branch of zoölogy dealing with invertebrates, that is, animals without backbones. He originated several theories regarding the classification of animals and the theory of evolution, and from 1799 to 1810 published each year a meteorological report, being the first scientist to attempt to forecast the weather. Lamarck was the author of several volumes, among them, *Zoölogical Philosophy, Flora of France* and *Animals without Backbones.*

LAMARTINE, *lah mahr teen',* Alphonse de Prat de (1790-1869), a French poet, whose *Meditations,* published in 1820, created a deep impression and brought him instant fame. His idealized autobiography is contained in his *Confidences* and *Raphael.* In the former he tells of his love for Lucy, when sixteen years of age, his voyage to Italy several years later, and his love for the fisherman's daughter, Graziella. In 1820 he was an under officer of the legation at Naples. His *New Poetic Musings* and the *Poetic and Religious Harmonies* obtained for him admission into the French Academy, and added to his fame as a poet. In his *History of the Girondists* he espoused the cause of the Revolution. As a history this work is unreliable, as it is not based on documents, but it is written in a charming style. In his *History of the Restoration* he gave an interesting account of the literary salons of the times. His other works include *Voyage en Orient, Jocelyn, Last Song of Childe Harold's Pilgrimage* and *History of the Revolution of 1848.*

LAMB, Charles (1775-1834), an English writer, best known as a light essayist. Born in London, he was sent to school at Christ's Hospital, where was begun his lifelong intimacy with Coleridge. In 1789 he became a clerk in the South Sea House, a position which he held until 1792, when he went to work in the accountant's office of the East India Company. The tragedy which darkened his entire life appeared first in 1795. He himself suffered from a brief spell of mental derangement, and soon after his recovery the family was overcome with grief and horror at his sister Mary's fatal stabbing of her mother, during a fit of acute mania. Mary's attack passed off but returned at intervals during the remainder of her life, and the brother gave himself gladly to the care of his sister, sacrificing the happiness of marriage with the "gentle maiden" whom he loved.

CHARLES LAMB

In the years 1796 and 1797 Lamb contributed poems to volumes brought out by Coleridge, and soon afterward published with his friend Charles Lloyd a volume entitled *Blank Verse,* in which appeared his best-known poem, *The Old Familiar Faces.* Next came *Rosamund Gray,* a story which had slight success, and within the next seven years the drama *John Woodvil* and the farce *Mr. H.,* both of which failed on the stage. It was not, indeed, until he wrote, with his sister Mary, the *Tales from Shakespeare,* succeeded by his own version of the *Adventures of Ulysses,* that he became a popular writer. His *Specimens of English Dramatic Poets Who Lived about the Time of Shakespeare* showed him to be a critic of exceptional discrimination and sympathetic discernment, and brought to the notice of the literary public the merits of the hitherto almost ignored lesser dramatists of the sixteenth century. More firmly than on any of these, however, his fame rests on the two volumes of *Essays of Elia,* which were written during the later years of his life, and appeared in the *London Magazine.* From 1825 until his death Lamb lived upon a pension granted by the East India Company after his long period of service. Freedom from regular employment, however, seemed to hamper rather than to develop his genius, and in his last years he produced little of importance. He died at Edmonton, and was sincerely mourned by his large circle of friends,

for his wit and geniality had made him a charming companion, and his unselfishness and loyalty had knit his friends firmly to him.

The *Essays of Elia,* the writings which show Lamb at his best, are a series of essays on a variety of subjects, written in a genial, rambling style which few authors of his own or any other nation have equaled. Their particular charm lies in large part in the quaint humor, pure sentiment and delicate fancy that pervade them, and in the unreserved and ingenuous manner in which the author reveals himself. In both his essays and his letters his never-failing good humor, his gentleness and his rare devotion to his family and friends are reflected with great clearness. A.MC C.

Consult Dobell's *Sidelights on Charles Lamb;* Lucas's *Life of Charles Lamb.*

LAMENTATIONS, *lam en ta' shunz,* one of the poetical books of the Old Testament, attributed in authorship to Jeremiah. It is an acrostic dirge (see ACROSTIC) and was composed for use by professional mourners in leading the wailing of the people over the fall of Jerusalem. Four of its five divisions are in the peculiar rhythm of the Oriental dirge, each line rising to a climax and then dying away to silence. The poem pictures vividly the desolation of the city and the sufferings of its inhabitants, and voices the sorrow of the people for their sin, which, as they believed, was responsible for the city's catastrophe. They hope for and then despair of forgiveness, and the closing section is a cry to Jehovah for judgment.

LAMMERGEIER, *lam' er gi er,* the largest of the European eagles, also called the *griffin vulture,* because of its partiality for dead and decomposed meat as food. Its great strength permits it to break carcasses into bits or carry them to a great height in the air and then let them fall. In some regions it feeds upon tortoises. The lammergeier is about four feet in length, and measures from nine to ten feet across its wings. It is found in Northern Africa and Southern Asia, and sometimes in the mountains and deserts of Southern Europe. It builds a crude nest on a mountain ledge, where it lays one brown-spotted egg. Its plumage is beautiful, its flight majestic.

THE LAMMERGEIER

LAMP, a device for producing light artificially. The torch was the first lamp. However, the skin-clad cave man who first thrust a lighted rush into an animal's skull filled with melted fat and observed the result, discovered the essential principle of the lamp as we know it to-day. His discovery was certainly one of the most important in history.

ANCIENT LAMPS

This picture is introduced to help boys and girls to appreciate the blessings of an age of brilliant electric lights. In the lamps above rude wicks were placed, and the resulting light was sufficient only to brighten a room to a slight degree.

The Greeks and the Romans with their genius for design simply improved the lamp's appearance and increased the illuminating power. They shaped shallow vessels of clay or metal, into which they poured an inflammable liquid. Sometimes several wicks were used, flax tow having by this time largely superseded rushes. To the ancients the lamp was not simply an article of domestic use. It was a symbol of wisdom and often appears as a sacred emblem. The old Greek myth, which tells how Prometheus stole fire from the gods, reflects the feeling of the early world as to the sacred mystery of fire.

No marked improvement in lamps took place until the end of the eighteenth century, when the Swiss chemist, Argand, substituted for the flat wick a tubular one set between two metal cylinders (see ARGAND LAMP). Shortly afterwards one of his assistants happened to notice that a flame burns more brightly when held under a tube of glass. The result of this observation was the lamp chimney. After the discovery of extensive oil wells in the United States, in the middle of the nineteenth century, kerosene began to be used instead of whale, lard and other oils. Because of the rapidly increasing use of gas and electricity for illuminating purposes the oil lamp is now practically out of date in cities.

LAMP'BLACK, a fine carbon or soot, produced commercially by the imperfect combus-

tion of such materials as coal or wood tar, pitch, petroleum, resin, etc. These substances are burned in brick furnaces or in cast-iron vessels; the dense smoke which results passes through a flue into the settling chambers, where the soot is deposited. Lampblack is used chiefly in the manufacture of paints and printers' ink, for which purposes the crude product is satisfactory; for India ink, the purified soot is preferred. See CARBON; INDIA INK.

LAMPMAN, ARCHIBALD (1861-1899), a Canadian poet whose lyrics have placed him in the front rank of nineteenth-century writers. Unfortunately his life was cut short when he was just beginning to win popularity, yet his work had continued to win recognition. Lampman was born at Morpeth, Kent County, Ontario, and was a descendant of United Empire Loyalists, of German extraction, who emigrated from Pennsylvania at the beginning of the Revolutionary War. Soon after his graduation (1882) from Trinity College, at Toronto, he entered the government service at Ottawa, which thereafter remained his home. In his college days he had begun to write verses, but it was not until 1888 that he issued his first volume. *Among the Millet and Other Poems* and *Lyrics of Earth* are collections of his poems which appeared during his lifetime. After his untimely death his friend and fellow-poet, Duncan Campbell Scott, edited a complete edition of his *Poems*. Examples of his verse may be found in the *Oxford Book of Canadian Verse*.

LAMPREY, *lam'pri,* an eellike fish, with a long, slender body and smooth, scaleless skin. The mouth is a sucking organ, provided with horny teeth by which lampreys attach themselves to living fishes and suck their blood. They also feed on insects and worms. The *brook,* or *mud, lamprey,* about eight inches long and bluish-black, is found in lakes and brooks from New York to Minnesota and Kentucky. The *sea* lamprey of the European and Mediterranean coasts is dark brown in color, mottled with black, and attains a length of three feet. It follows the shad up the rivers to spawn in fresh water in the spring, returning to the sea in the autumn. A little blood poured into the water inhabited by lampreys soon attracts them to the spot, and they may then be caught in traps, like eels.

LANCASTER, OHIO, the county seat of Fairfield County, is situated southeast of the geographical center of the state, thirty-one miles southeast of Columbus, on the Hocking River and the Hocking Canal. The Pennsylvania (C. A. and C. Division) and the Hocking Valley railroads serve the city; the Scioto Valley Traction Company connects with Columbus. In 1910 the population was 13,093; it had increased to 15,670 in 1916 (Federal estimate). The area of the city is a little less than four square miles.

Lancaster is located in a fertile valley and is the farming center of Fairfield County. Near the center of the city Mount Pleasant rises to an elevation of 200 feet, and surrounding it are seventy acres of the county agricultural grounds, which are used as a park. On another eminence stands the county courthouse. The city has a $75,000 Federal building, the Sherman Armory, the state industrial school for boys, Crawfis Institute, a commercial school, a high school and a library. Lancaster is extensively engaged in the manufacture of shoes, 1,200 people being employed in these factories. In addition, there are glass factories, carbon works, farm implement plants, rubber-tire and lens factories. The shops of the Pennsylvania Railroad are also located here.

Lancaster was founded in 1800 by Ebenezer Zane. It was incorporated as a village in 1831, and in 1851 as a city of the third class. Some of the early settlers came from Lancaster, Pa., and they decided to build their new city under the name of the old home. The growth of the city began in 1900 with the development of the natural gas fields in the vicinity, and it increased after 1907 when petroleum was discovered near by. C.H.S.

LANCASTER, PA., the county seat of Lancaster County, is an important commercial city and educational center in the southeastern part of the state. The population, which is almost entirely American, was 47,227 in 1910 and 50,853 in 1916 (Federal estimate). The area of the city exceeds four square miles. It is surrounded by many smaller towns, with which it is connected by more than a dozen interurban electric lines. It is on Conestoga Creek, a tributary of the Susquehanna River, and is served by the Pennsylvania and the Philadelphia & Reading railroads. Philadelphia is sixty-nine miles east, New York City is 159 miles northeast, and Harrisburg, the state capital, is thirty-six miles northwest.

Industries. Lancaster is situated in a rich agricultural country. The largest crops are wheat and tobacco. The cigars and tobacco manufactured in the city every year are valued at more than $2,000,000. The city is

noted for its manufacture of Hamilton watches (the output valued at $2,000,000 annually), umbrellas, parasols and canes; in the latter Lancaster ranks next to New York City. The manufactured goods of Lancaster city and county are valued at $41,000,000 yearly.

Buildings and Institutions. There are several attractive parks, the largest of which are Long's, seventy-seven acres, and Williamson's, seventy-one acres. In the city is a soldiers' and sailors' monument, marking the spot where the Continental Congress convened in 1777 (see CAPITALS OF THE UNITED STATES). Prominent buildings include the courthouse, Federal building, Y. M. C. A. and Y. W. C. A. buildings and the public market houses. Among the public libraries of the city are the Watts De Peyster Library, A. Herr Smith Memorial Library, Lancaster Law Library, and a semipublic library is owned by the Lancaster County Historical Society. A number of important church periodicals and scientific magazines are published here.

Lancaster is the seat of Franklin and Marshall College, Franklin and Marshall Academy, Froebel Kindergarten, Shippen School for Girls, Sacred Heart and Saint Mary's academies, Thaddeus Stevens Industrial School, Reformed Theological Seminary and Yeates Institute for Boys. In near-by towns are important schools; at Millersville is the oldest and largest normal school in the state; and at Lititz is the Moravian Seminary for girls, which is more than a century old.

The charitable institutions include the Ann C. Witmer Home for Widows and Maiden Ladies, the Long Home for Aged Women and the Stevens Home for Friendless Children. There are Lancaster General, Saint Joseph's Catholic and Lancaster County hospitals and the Lancaster County Hospital for the Insane.

The town was settled by English Quakers and Germans in 1717, incorporated as a borough in 1742, and received its charter as a city in 1818. C.N.

LANCASTER, HOUSE OF, the name of the kingly line that ruled in England from 1399 to 1461 and again in 1470-1471. The name originated during the reign of Henry III, who in 1267 conferred the title Earl of Lancaster on his second son, Edmund. On the failure of male heirs, John of Gaunt, fourth son of Edward III, married Blanche, the heiress of the House of Lancaster. Gaunt was created Duke of Lancaster in 1362, and at the same time his elder brother, Lionel, was created Duke of Clarence. In such manner originated the rival houses of Lancaster and York, whose emblems were, respectively, the red rose and the white rose.

In 1399, Henry of Lancaster, son of John of Gaunt, dethroned Richard II and became king as Henry IV, for, though his title was defective, his claim to the throne was accepted by Parliament. Henry was the first English king to rule by Parliamentary right. His successor, Henry V (1413-1422), maintained his position by winning the favor of Parliament and the Church, and by grace of his brilliant successes in the Hundred Years' War. The weak and inefficient Henry VI, who was deposed in 1461 and restored for a brief period in 1470, and whose troubled reign culminated in the Wars of the Roses, was the last representative of the Lancastrian line. Shakespeare gives a vivid picture of this period of English history in his *King Henry VI.*

In connection with the above, see YORK, HOUSE OF, the rival of the Lancastrian line, and ROSES, WARS OF THE.

LANCELOT, *lan'se lot,* generally known as SIR LANCELOT DU LAC, one of the knights celebrated in the traditions and fables relating to King Arthur and the Round Table, as they found final shape in the *Morte d'Arthur* (1469) of Sir Thomas Malory. According to these, Lancelot was of royal birth. He was educated by the Lady of the Lake and was taken by her to Arthur's court, where he became one of the chief knights. His love for Guinevere, the beautiful wife of Arthur, constituted the tragedy of Lancelot's life. He fought in many combats for her, always extricating himself with valor under the protection of the Lady of the Lake. When Guinevere entered the sanctuary, he, too, was received into a cloister, thus giving up forever the hope of taking her away to the distant retreat of Joyeuse Garden. Upon the death of Guinevere he was summoned to bury her beside the corpse of Arthur, and he soon followed her in death. Elaine, the beautiful maid of Astolat, loved Lancelot and died for her love. Lancelot is one of the chief characters of Tennyson's *Idylls of the King,* and the story of his love for Guinevere is the principal theme of the twelve books. See ARTHUR, KING; MALORY, SIR THOMAS.

LANCE'WOOD, the name of several tropical trees and their wood, which is of unusual tenacity and elasticity. Because of these qualities it is much used for cabinetwork, surveyors' and fishing rods, carriage shafts, etc. Even

the Deacon who built Oliver Wendell Holmes' *Wonderful One-Horse Shay*—

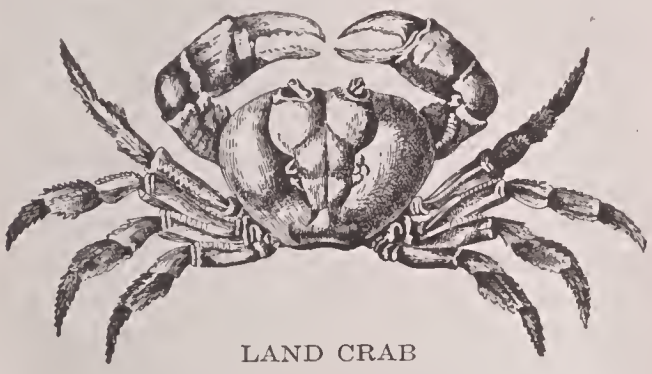
Sent for lancewood to make the thills.

Lancewood is light yellow in color, and resembles boxwood.

LAND AND SEA BREEZES are the shore breezes which blow alternately from sea to land and from land to sea in warm climates, and in temperate regions in summer. During the day, as the land grows warmer the air pressure becomes lower and the air rushes in from the sea, which for the most part remains at the same temperature, and during the day is usually much cooler than the land. This breeze usually continues from noon into the night, when the land cools rapidly. The atmospheric conditions are then reversed; the warmer ocean, being the area of atmosphere of low pressure, receives the breeze from the cooler land. This breeze lasts until the middle of the morning, when it dies, and the calmer part of the day sets in, because the temperature of the land and the sea are about the same for several hours.

These breezes are sometimes noticeable ten miles inland, although two or three miles is as far as they usually penetrate. Land and sea breezes occur daily in the tropics, but are not invariable in temperate regions. Similar breezes blow on the shores of the Great Lakes. See WIND.

LAND CRAB, the name given to any sort of crab which lives on land. There are a number of such species, and they almost exactly resemble common crabs. In spite of living on dry land, these crabs breathe by



LAND CRAB

gills, but they are provided with a moisture chamber lined with spongy membrane which keeps the gills damp indefinitely. Land crabs are found in the warmer countries of both hemispheres, burrowing beneath rocks, roots or in the sand during the day, and coming out only at night, except in rainy weather. All land crabs carry their eggs to the water, and at the beginning of the rainy season in May the migration to the sea begins. The male crabs start the march and are followed in two or three days by the females. They have an annoying habit of refusing to turn from their path and of walking straight through, or under, a house, where such a feat is possible. In tropical countries the rattling of land crabs over the floor at night is a common sound. Several species are edible; in Jamaica they are a regular article of food for the natives, but are disliked by the whites. The most common are the *black crab,* or *mountain crab,* of the West Indies, and the *white crab* of Jamaica.

LANDOR, *lan'dawr,* WALTER SAVAGE (1775-1864), a graceful and forceful English writer, whose fame rests chiefly on his dialogue essays *Imaginary Conversations* between ancient and modern celebrities. He studied at Rugby and Oxford, but was expelled from both institutions for unruliness. He published a small volume of poems in 1795 and a long poem, *Gebir,* in 1798. The latter was afterwards translated into Latin. Among his other poetical works are *Simonides; Count Julian, Hellenics;* and *Collected Poems.* His prose works include *Pericles and Aspasia; The Last Fruit Off an Old Tree; Dry Sticks Fagoted,* and others.

LANDS, PUBLIC. Parts of the national domain still under the ownership and control of the government, but held for future sale or other disposal are called *public lands.* Literally the term includes all lands owned by the government; in common use, however, it is applied only to land intended for development or settlement, not to forest reserves (see FORESTS AND FORESTRY) and other restricted areas.

In the United States. The public lands of the United States were acquired by cessions from the states and by purchase and conquest from the Indians and from foreign nations. In 1781, when the Confederation was organized, the new government found itself the owner of New York's claim to certain lands between the Alleghany Mountains and the Mississippi River. Between that date and 1802, when Georgia relinquished its claims, all the Atlantic coast states surrendered to the national government the western lands which they claimed under their colonial charters. Connecticut and several other states reserved a few sections for the assistance of the Revolutionary War veterans and for similar purposes, but these areas were comparatively small. In 1803 the national domain was doubled by the Louisiana Purchase, which added more than 1,000,000 square miles, if Oregon is included

(see LOUISIANA PURCHASE). Sixteen years later, in 1819, 60,000 square miles were secured by the purchase of Florida from Spain. The annexation of Texas in 1845, the Mexican cessions in 1848 and the Gadsden Purchase of 1853 rounded out the territory of the United States proper to its present boundaries.

After the territory of states and foreign nations was thus acquired there still remained to be settled the rights of those who had the best claim to the land—the Indians. As the settlements of the white men spread westward, the Indians were forced to move ahead of them in the same direction. Usually the government purchased the Indian lands, and offered in exchange lands farther west. Even in the West the Indians have not found a safe retreat, and many of their reservations have one by one been taken over by the government and thrown open to settlement, though the government has given financial compensation. See INDIANS, AMERICAN, subhead *Indian Reservations.*

Disposal of Public Lands. The United States has, from time to time, disposed of public lands of a total estimated area approaching one billion (1,000,000,000) acres, or nearly half the total area of the country. The policies which have governed the distribution of these vast tracts have changed frequently, but it is possible to summarize them. The first plan was to make the lands yield a revenue—in the words of Alexander Hamilton, "to effect a gradual discharge of the domestic debt, and furnish liberal tributes to the Federal treasury." As the country grew richer two other purposes became prominent: to induce settlement of the lands and to provide funds for public purposes which would have placed too great a burden on the people if paid by taxation. To encourage settlement, large tracts were first sold to land companies, notably in Ohio and Kentucky, the companies agreeing to secure settlers. Later, land was sold in small lots, occasionally on credit, to individual settlers. The credit system was abolished in 1820, and thereafter land was sold for cash in areas as small as eighty acres, for $1.25 an acre. After 1837, when a panic ended the boom in Western lands, the *preëmption* system was introduced, and in 1862 the first of the *homestead laws* was passed. (The article on the latter subject tells how *preëmptions* and *homesteads* are obtained.)

In the early days of the republic, and indeed until a decade after the War of Secession, large areas were granted to individuals as a reward for distinguished services to the nation. Nearly 10,000,000 acres were given to veterans of the Revolution and the War of 1812, and about 60,000,000 acres were set aside for soldiers who had taken part in the Mexican War. Millions of acres were also granted at various times to corporations engaged in building roads, canals and railways. The construction of the Illinois

LAND GRANTS

Limits within which land grants were made by the United States government to aid in the construction of railroads and highways. The maximum amount of land granted was one-half of the area (usually every other section) within the shaded parts of the above map. The total area granted to railroad companies was 190,000,000 acres; for wagon-road construction, 3,300,000 acres.

Central and the Pacific railways was made possible by the grant of more than 200,000,000 acres; from the sale of these lands the railroads have added greatly to their income, but in the beginning they could not have been built without such assistance. In 1902 Congress passed the Reclamation Act, which set aside all money received from the sale of public land in sixteen of the western arid or semiarid states as a special fund for the construction and operation of irrigation systems (see IRRIGATION).

Perhaps the most important of all land gifts have been those to the states to encourage education. All states admitted to the Union before 1850 received one-thirty-sixth of their area—one section in each township—as a foundation for a school fund. Those admitted since 1850 have received two sections in each township. The land thus granted—about 75,000,000 acres—is a small fraction of the total granted in other ways, but it has been the means of providing each new state with revenue to establish its public school system. Each state on its admission has also received a tract of from one to four townships to create a fund for a state university, and by the Morrill Act of 1862 it also receives an area proportionate to

its representation in Congress as a subsidy or endowment for an agricultural college. These additional gifts have involved about 10,000,000 acres.

Remaining Public Lands. Though much of the public land has thus been granted or sold, large sections still remain, chiefly in the West. The following table gives the areas still unappropriated and available for settlement, on July 1, 1916:

STATE OR TERRITORY	AREA UNAPPROPRIATED AND UNRESERVED			STATE OR TERRITORY	AREA UNAPPROPRIATED AND UNRESERVED		
	Surveyed	Unsurveyed	Total		Surveyed	Unsurveyed	Total
	Acres	Acres	Acres		Acres	Acres	Acres
Alabama	42,680	.....	42,680	Montana	9,229,154	7,420,571	16,649,725
Alaska*	.....	.....	.....	Nebraska	137,936	8,320	146,256
Arizona	6,566,288	17,030,931	23,597,219	Nevada	30,529,318	24,845,759	55,375,077
Arkansas	402,219	.....	402,219	New Mexico...	18,437,388	7,900,991	26,338,379
California ...	15,777,934	4,248,065	20,025,999	North Dakota.	381,199	.....	381,199
Colorado	12,905,344	2,002,783	14,908,127	Oklahoma	55,250	.....	55,250
Florida	135,237	.....	135,237	Oregon	13,942,348	1,395,461	15,337,809
Idaho	8,831,490	6,679,071	15,510,561	South Dakota..	2,328,807	53,781	2,382,588
Kansas	56,018	.....	56,018	Utah	14,435,859	18,532,978	32,968,837
Louisiana	44,804	.....	44,804	Washington...	982,783	149,788	1,132,571
Michigan	90,540	.....	90,540	Wisconsin	5,872	.....	5,872
Minnesota ...	798,804	.....	798,804	Wyoming	26,567,740	1,960,752	28,528,492
Mississippi ..	30,374	.....	30,374				
Missouri	952	.....	952	Grand Total.	162,716,338	92,229,251	254,945,589

* The unappropriated lands in Alaska are not included herein. The total area of Alaska is 378,165,760 acres, of which about 15,500,000 acres are reserved.

Management of Public Lands. The administration of the public domain is the work of the General Land Office, a bureau in the Department of the Interior. At its head is the Commissioner of Public Lands, who is appointed by the President and receives an annual salary of $5,000. The Commissioner is responsible for the surveying and sale of lands, and for all documents and records in connection with them. He reports annually to Congress, and issues maps and circulars of information to the public. In each state where the area of the public lands exceeds 100,000 acres there are local Federal land offices, in charge of a register and a receiver, both appointed by the President. The registrar receives applications for land, and when the final payments have been made issues a certificate entitling the owner to a deed, or patent, from the United States. The patents are issued by the General Land Office in Washington and are signed by the recorder and the secretary; formerly they were signed by the President, but a secretary, appointed by the President, now performs this duty. All decisions of the local receivers or registers are subject to final approval by the Commissioner.

Ranges, Townships and Sections. When public lands are surveyed they are divided like a checkerboard into *townships* six miles square. Each township contains thirty-six sections of one square mile each, or 640 acres. The sections are subdivided into quarter-sections of 160 acres. For purposes of description all townships in a north and south line are said to be in a *range*. Certain of the meridians of longitude are called principal meridians and certain of the parallels of latitude are named as base lines. If a township is the second one north of a base line in the fifth range east of the second principal meridian it is described as *Township two north, range five east of the second,* as shown on the first diagram below. The description *SW ¼ NW ¼ Sec. 9, Tp. 2N R5*

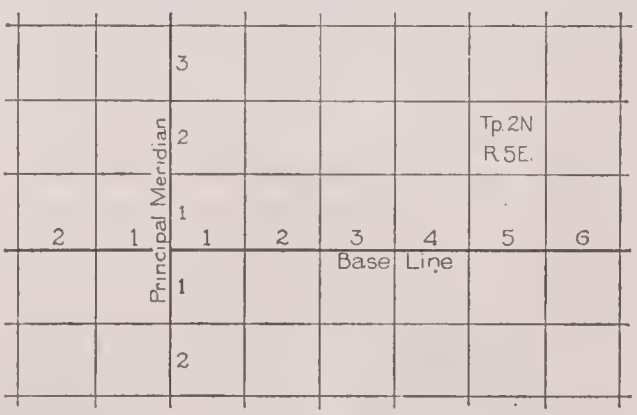
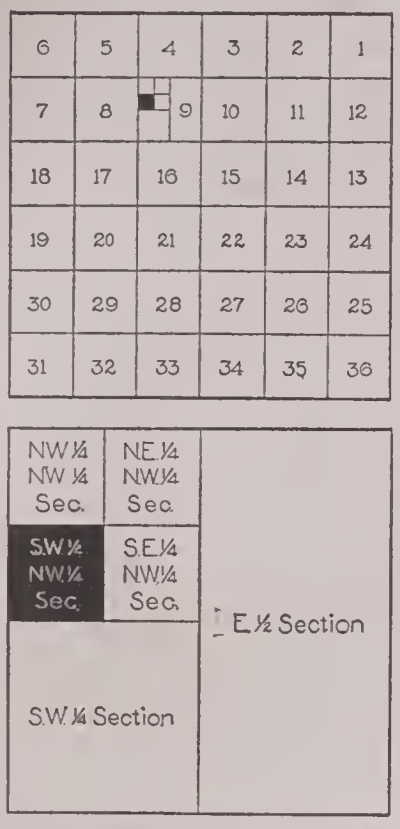


DIAGRAM OF TOWNSHIPS AND RANGES

E2 refers to the forty-acre tract shown in black in the diagrams; it means the southwest quarter of the northwest quarter of section nine in township two north in range five east of the second meridian.

In Canada. The public lands of the Dominion of Canada are known as *Crown lands.* They are situated almost entirely in the provinces of Manitoba, Saskatchewan and Alberta and in the Northwest Territories, and were acquired by purchase from the Hudson's Bay Company in 1869. Elsewhere in Canada the Crown lands are controlled by the provincial

governments, each of which retained its portion when incorporated into the Dominion. The only exception is in British Columbia, where the Dominion government owns a strip twenty miles wide on each side of the Canadian Pacific Railway, and a tract of 3,500,000 acres on the Peace River. Theoretically "Crown lands" are the property of the king, as in feudal days, but actually they belong to the people and are administered by their government.



HOW TO LOCATE A FARM

The upper diagram shows a regularly laid-out township of thirty-six square miles, or sections, each containing 640 acres. The lower diagram represents in enlarged form section nine of the upper. How many acres in this SW ¼ of the NW ¼?

The policy of the Dominion government has been to promote the proper settlement of its lands. Large areas have been given to assist railroad construction, and millions of acres of agricultural land have been granted to settlers under the terms described in the article Homestead Laws. To the provincial governments have been ceded sections eleven and twenty-nine in each township to be sold for public school funds. The Dominion reserves all oil and mineral rights on land given to settlers. These rights and the privileges of grazing or cutting timber on unsettled land are leased to individuals or companies. Large tracts of land have been sold to irrigation companies.

The amount of land still in the possession of the Dominion government on January 1, 1915, and available for cultivation, is shown by the following table:

Province	Area in acres		Total
	Surveyed	Unsurveyed	
Alberta	14,500,000	79,471,784	93,971,784
Manitoba	5,575,000	112,832,896	118,407,896
Saskatchewan	8,000,000	74,980,320	82,980,320
	28,075,000	267,285,000	295,360,000

There were also 2,457,000 acres in Alberta, 15,500 in Manitoba and 1,922,000 in Saskatchewan leased for grazing, which may later be available for settlement.

Administration of Public Lands. All lands in the control of the Dominion are in charge of a branch of the Department of the Interior, at the head of which is a Commissioner whose salary is $4,000 a year. A number of land agents are located in the four provinces in which the lands are situated.

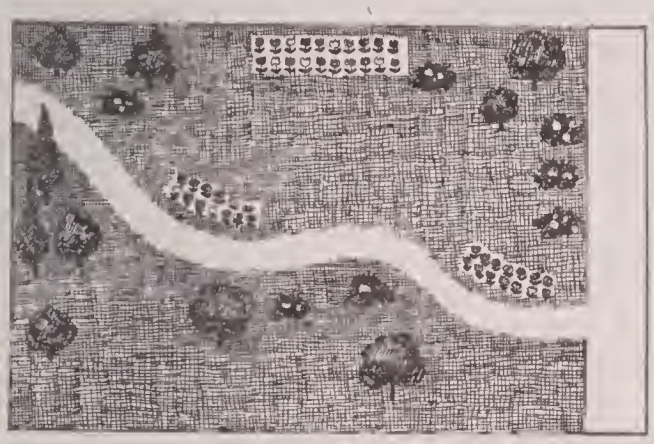
Canadian townships are surveyed in thirty-six sections, like those in the United States except that numbering begins at the southeast corner and finishes at the northeast corner (see the illustration above, of a township in the United States). The international boundary is taken as the base line, from which townships are numbered. W.F.Z.

LANDSCAPE GARDENING, or **LANDSCAPE ARCHITECTURE,** is the art of changing the natural surroundings of any place so as to produce the most artistic results. The architect may build a beautiful house, but if it is in the midst of a barren prairie the effect is not pleasing. The gardener, on the other hand, may lay out his garden according to a plan which totally disregards the house or its surroundings. It is the business of the landscape gardener or landscape architect to create a harmony in the landscape. If the architect has built a house which seems out of place, the landscape architect should change the surroundings so that the building seems naturally a part of the landscape. The work of an artist in landscape gardening is essentially like that of the landscape painter, for they both deal with perspective, mass, shadow and other principles. The painter, however, is handicapped, for he only creates a counterfeit in two dimensions, whereas the landscape gardener creates the picture in three dimensions. The gardener actually puts a hedge, a tree, a flower bed or a fountain where he thinks it looks best, but the painter can only reproduce it on a flat surface.

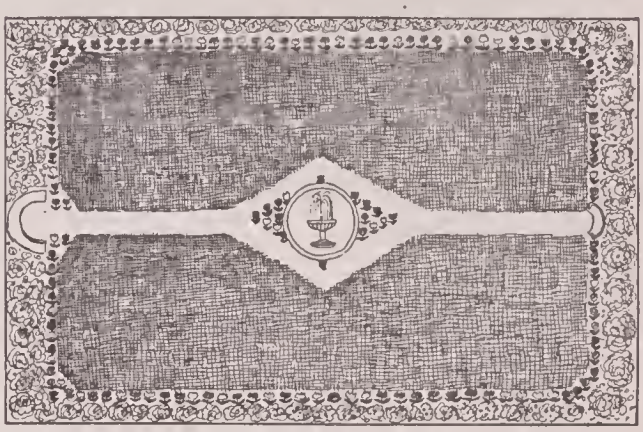
Landscape gardeners are concerned not merely with small houses in cities, but with country homes, both large and small, with

parks, playgrounds, cemeteries and expositions. The landscape gardening at the World's Columbian Exposition in Chicago in 1893 set a standard for work on a large scale which has never been surpassed. It was the work of Frederick Law Olmsted, whose father is generally regarded as the founder of landscape gardening in America. The work of Jules Guerin, director of color and decoration at the Panama-Pacific Exposition at San Francisco in 1915 was perhaps equally notable. The modern garden cemeteries, which are so characteristically a product of America, are other examples of landscape gardening at its best. In its largest field, landscape gardening is closely allied to, and is in fact a branch of, city planning (which see).

Landscape gardening to-day is divided into two distinct styles, one formal, the other informal. Formal landscape gardening attempts to improve Nature's work by making it regular. In formal gardening geometric figures are used as a basis. Gardens are laid out in regular shapes, squares, circles, ovals and balanced figures. The accompanying sketch shows a typical estate laid out on formal lines. The English or natural style, on the other hand, is informal. It, too, attempts to improve Nature's work, but it uses no fixed patterns. Its highest achievement is to make a landscape look natural.



AN INFORMAL GARDEN



ON FORMAL LINES

In the natural style, which has now almost entirely supplanted the formal or artificial method, straight lines, sharp angles or curves and elaborate patterns are avoided. Walks are irregular and winding, and groups of trees, flowers and shrubs are placed at intervals as if Nature herself had carelessly planted them there. Formal gardening is best suited to confined or small spaces, and is usually out of keeping with the vast stretches of great private estates or public parks; but the natural style is suitable both for large and small estates. The accompanying sketches show very simple gardens, arranged on formal and on informal lines. A.E.R.

Consult Bailey's *Garden Making;* Parson's *Landscape Gardening Studies.*

LAND'SEER, Sir Edwin Henry (1802-1873), an English painter, who won high renown for his pictures of animals. Dogs and deer were his favorite subjects, and he painted them with such skill and feeling that they stand out from his canvases almost as if alive. Landseer's artistic career falls into two periods, one of which began in early youth. His father, John Landseer, a London engraver and writer on art, early discovered the lad's skill in drawing animals, and trained him to sketch them accurately from life. At the age of five the boy drew fairly well, and before he was ten he proved himself an excellent draughtsman. When thirteen years of age Landseer first exhibited at the Royal Academy, and at fifteen he was already famous and had more commissions for work than he could possibly carry out.

SIR EDWIN LANDSEER

The painting which brought him prominently before the general public was his *Fighting Dogs Getting Wind,* exhibited in 1818. This picture, generally regarded as the masterpiece of his boyhood, is perfectly drawn, and finished with a minuteness which is almost photographic.

Until about 1823 Landseer was satisfied to draw animals as they were, merely reproducing their natural expression and character. Dur-

ing the second period of his long career he constantly attempted, usually with remarkable success, to associate human sentiments with them. Many admirers feel that Landseer's best work is *Suspense,* which shows a dog watching at the closed door of his wounded master. *The Old Shepherd's Chief Mourner* is another favorite, as are also *A Distinguished Member of the Humane Society; The Cat's Paw; High Life and Low Life; The Illicit Whisky Still; The Monarch of the Glen,* a splendid buck against a background of mountains; *The Stag at Bay,* cornered by a wolf; and *Eos,* a portrait of the Prince Consort's favorite greyhound. *The Connoisseurs* is a portrait of himself and his two favorite dogs.

Landseer's paintings are very numerous. He worked with amazing rapidity, turning out finished sketches in a few hours, and in the course of his lifetime he finished thousands of paintings. His work won general recognition; he was elected to the Royal Academy, was knighted in 1850 and was paid enormous fees. Much of his popularity with the general public was due to his brother Thomas (1795-1880), who reproduced many of his paintings as steel engravings.

Consult Sweetser's *Landseer,* in "Artist Biographies;" Manson's *Makers of British Art.*

LAND'S END, a cape in Cornwall, the westernmost point of England, which marks the entrance to the English Channel and is the last point of land seen by voyagers out of the Channel when starting westward across the Atlantic Ocean. It ends in granite cliffs, sixty to a hundred feet high, fantastically carved by the water. The vicinity is noted for fine cliff scenery.

Dangerous reefs lie off the coast, one rocky islet being marked by the Longships lighthouse, a mile from the mainland. Tin is found in the vicinity, and the point is celebrated for one of the natural rocking stones of the kingdom, known as the Logan stone, weighing over sixty tons.

LANDSTURM, *lahnt'stoorm,* from a German word roughly meaning *a land's alarm,* is a term applied to the fourth, and last, division of the German and Austrian armies, consisting of men who have reached their thirty-ninth year and have passed through active, reserve and *landwehr* service, after which they are released from further military obligations, except in case of dire need in time of war. The *landsturm* is the last branch called out in a war levy. In the War of the Nations, which began in 1914, the landsturm, while not on the firing line, rendered good service in guarding roads, bridges and military supplies. See LANDWEHR.

LANDWEHR, *lahnt'vayr,* a term derived from the German, meaning *land defense,* is applied to militia for use in emergencies in Germany, Austria and Switzerland. It is not called into actual field service except in time of war. It corresponds roughly to the militia of the United States, except that service is compulsory.

The German landwehr consists of about 600,000 men, who in war are called out in two levies; the first takes the place of the regular army reserves, and the second does garrison duty. This branch of military service was first organized in 1813 by a royal edict, for the national defense of Prussia, and was extended to the empire of Germany in 1871. A German conscript, or enrolled soldier, completes his service in the landwehr at the age of thirty-nine, and is then transferred to the *landsturm* for service until his forty-fifth year. In the wars with Austria and France, as well as in the War of the Nations, which broke out in 1914, the landwehr proved an effective force. See LANDSTURM.

LANFRANC, *lan'frahngk* (?1005-1089), a churchman and scholar and the first archbishop of Canterbury after the Norman conquest. He was born at Pavia, Italy, studied law in his native city, and in 1039, in the hope of achieving greater distinction, he went to France. There he founded a school of law at Avranches, Normandy, which soon became one of the best known in Europe. In 1042 he entered the Benedictine monastery at Bec, of which he became prior in 1045. In 1066 he left Bec, and as a reward for obtaining the Papal consent to the marriage of William of Normandy to his cousin, was appointed abbot of a new monastery at Caen. Following William's conquest of England Lanfranc was appointed by him in 1070 to the archbishopric of Canterbury. He acted as regent of the kingdom during William's absence from the country and played an important part in religious and civil affairs. His writings include *Commentaries on the Epistles of Saint Paul, A Treatise Against Berenger* and some interesting sermons and letters.

LANG, ANDREW (1844-1912), a versatile writer who did many things well but who produced no single work of unusual merit, was born in Selkirk, Scotland. He collaborated with Professor Butcher on an excellent version

of the *Odyssey*. His contributions to the study of comparative mythology and religion are *Custom and Myth; Myth, Ritual and Religion; Secret of the Totem, The Clyde Mystery* and others. He published several volumes of ballads, biography, history, translations and fairy tales. He was educated at Edinburgh Academy, Saint Andrew's University and Balliol College, Oxford. His works include *Lost Leaders* and *Letters on Literature; Homer and the Epic; A Defence of Sir Walter Scott and the Border Minstrelsy; Shakespeare, Bacon and the Great Unknown; Letters to Dead Authors,* and other volumes.

LANGEVIN, *lahNzh'van',* Sir Hector Louis (1826-1906), a Canadian statesman, one of the leaders in the movement for Confederation, and for three decades thereafter one of the most conspicuous members of the Conservative party. A member of a distinguished Quebec family, he won prominence in public affairs at an early age. He established an honorable reputation at the bar, and also gave some of his time to literature, contributing frequently to the press, and serving as editor of the *Journal of Agriculture*. His varied activities, added to his social prominence, made him mayor of Quebec in 1858, when he was only thirty years old. He served until 1861, and during the next five years held several portfolios in the Canadian Ministry, including those of Solicitor-General for Lower Canada and Postmaster-General. He was conspicuous in the Confederation movement for his tact, suavity and broad statesmanship, and was one of the delegates to the conference at which the British North America Act was drafted.

After the organization of the Dominion, Langevin became Secretary of State in the first Dominion Cabinet. In 1873 he resigned with the other members of the Macdonald Ministry, and remained in opposition until 1879, when he became Minister of Public Works, a post he filled with ability until 1891. From 1867 until his retirement from public life in 1896 he served without a break in the Dominion House of Commons. His ambition was to create a feeling of brotherhood between his own people and their English-speaking compatriots. In recognition of his many services to Canada and the Empire Queen Victoria made him a Knight of the Order of Saint Michael and Saint George.

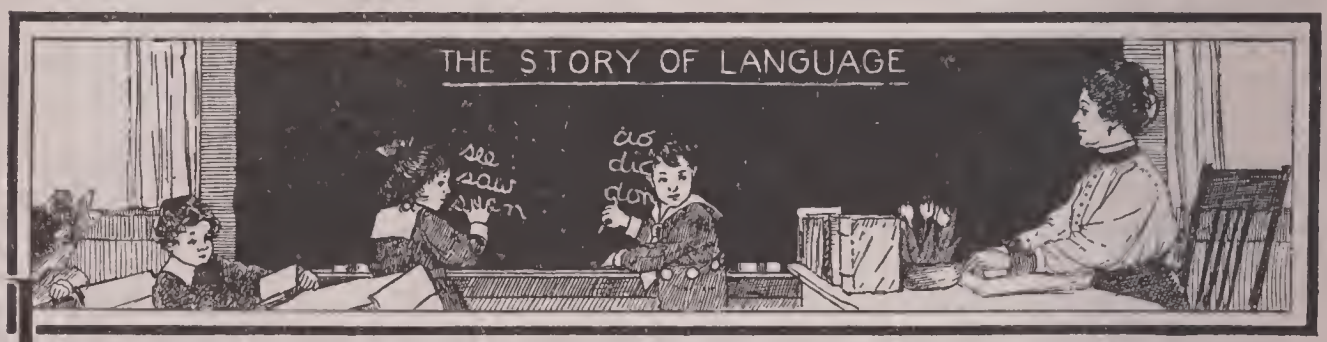
LANGEVIN, The Most Reverend Louis Philippe (1855-), a Canadian Roman Catholic churchman, archbishop of Saint Boniface, and one of the most influential prelates in the Dominion. Archbishop Langevin was born at Saint Isidore, Que., and received his scholastic training at the Sulpician College, Montreal. For several years after his graduation he taught the classics in that college, but in 1881 he entered the Oblate Order. In 1882 he was ordained priest, and three years later was called to the chair of theology in the University of Ottawa. There he remained until 1893, when he removed to Manitoba to become superintendent of all the Oblate Missions in the Northwest Territories. After a year as superintendent, followed by a year as pastor of Saint Mary's Church at Winnipeg, he was honored by his consecration as archbishop of Saint Boniface. Though he was only forty years old at the time of this appointment, his subsequent career fully justified the confidence thus placed in him. In the breadth and depth of his influence he is a worthy successor of Archbishop Taché.

LANGLAND, William (?1332-1400?), with the exception of Chaucer, the greatest English poet of the fourteenth century. He was probably the author of *The Vision of Piers Plowman,* a great satirical allegory, vigorously attacking Church and State corruption; and of *Richard the Redeless,* dealing with the life of Richard II. Very little is known of Langland's life. He is supposed to have been born near Shropshire and to have studied with the Benedictine monks, after which he drifted to London, where he lived in poverty.

LANGLEY, *lang'li,* Samuel Pierpont (1834-1906), an American astronomer, physicist and pioneer in aeronautics. He invented the bolometer, the most delicate instrument for recording solar heat, capable of detecting a variation of less than one millionth of a degree. Langley was born at Roxbury, Mass., and was educated at the Boston Latin School. In 1865, after a period of study in Europe, he was appointed professor of mathematics in the United States Naval Academy at Annapolis, later becoming professor of astronomy at the Western University of Pennsylvania and secretary of the Smithsonian Institution in 1887. He established the Astrophysical Observatory and the National Zoölogical Park at Washington, became in 1886 president of the American Association for the Advancement of Science and received from Oxford University the degree of D. C. L., the Janssen medal of the Institute of France and the Rumford medal of the Royal Society of London.

The First Flying Machine. Three successful flights of half a mile having been made by power-driven models of Langley's construction in 1896, Congress granted him $50,000 to build a man-carrying aerodrome (as he called his aeroplane). But he met with ill success and finally abandoned the experiments for lack of funds. His last machine was generally called "Langley's Folly." On February 27, 1906, heartbroken, it is said, at the failure of his experiments, he died. Since his death, however, his genius has been vindicated, for in June, 1914, Glenn Curtiss performed many successful flights on the very machine on which Langley had placed his hopes. See FLYING MACHINE.

LANGTRY, *lang'tri,* LILY (1852-), an English actress, known as the *Jersey Lily* on account of her beauty, was born at Le Breton, on the island of Jersey. Her maiden name was LILY LE BRETON, and she was the daughter of a clergyman of the Church of England. In 1874 she was married to Edward Langtry, and in 1881 made her first stage appearance in London in *She Stoops to Conquer.* In the following year she visited America and was enthusiastically received, more, perhaps, on account of her physical attractions than for her ability as an actress. Two years after the death of her husband in 1897, she married Sir Hugo Gerald de Bathe. In 1903 she returned to America and starred in *The Crossways,* a play written by her in collaboration with J. Hartley Manners. She again visited the United States in 1912, appearing in vaudeville.



LANGUAGE, *lang'gwaje.* Men, birds and the higher animals have various ways of communicating with others of their own kind. In a way all these means of communication may be called *language,* but in the ordinary sense in which the term is used language means the articulate speech of man. Every nation and every tribe has its language, and there are upwards of 1,000 spoken languages in the world. Some of these, especially the languages of barbarous tribes, are very narrow in scope and limited in extent. They include a comparatively small number of words, and are spoken by a limited number of people. Unless a language has been reduced to writing it has not been systematized, neither does it have any standard by which it can be brought to a higher degree of perfection. It is a "grammarless tongue." The great languages of the civilized world are usually classified under two groups, called *families.* They are the *Indo-European* family, which includes most of the languages spoken in Europe and America (excluding the Indian languages) and some of the languages of Asia, especially those of India; and the *Semitic* family, which includes the languages of the Hebrews, Arabs, Abyssinians, Assyrians, Phoenicians and Syrians.

Origin of Language. Many theories have been advanced to account for the origin of language, but none seems to be perfectly satisfactory. One of these theories is that the first words used by men were imitations of the sounds of animals, and that some of these sounds have become permanent words. Just as a little child may indicate a dog by "bow-wow," so did the natives of Madagascar indicate an animal found upon that island by "aye-aye." Later, when the island was discovered by civilized men, this name was given the animal. In a similar manner the words *whip-poor-will* and *katydid* originated. Interesting as this theory is, it is not generally accepted.

The theory most widely accepted is that language, in the sense in which we are considering it, is peculiar to man, and that it has been developed through the ages to enable men to communicate their ideas to others. However this may be, wherever we find men we find them able to converse with each other, and it is through the development of language that the human race has been able to record its achievements from century to century, and in this way to enable each generation to improve upon all the generations that have preceded it since time began.

Steps in the Study of Language

The person who can use the mother tongue fluently, accurately and effectively in the expression of his thought has a power and a possession that will serve him at every turn.
—*Indiana Uniform Course of Study.*

The importance of the study of English cannot be overemphasized, and in the primary grades all the activities of the child's mind should be made to contribute to the strengthening of his power of expression through language. While the trite saying, "Every lesson a language lesson," should in a measure be regarded, language should not be made the chief end of every lesson, because every lesson has its specific purpose. A lesson on the violet, for instance, should be devoted principally to gaining a knowledge of that plant on the part of the pupils. Incidentally wrong forms of expression may be corrected, but if time is spent on drills in language, the lesson is diverted from its main purpose. These drills, however, are necessary; therefore courses of study provide for language lessons in every grade.

The course of study and the suggestions for its development given in the following pages conform to the plans outlined in the best state and provincial courses of study for common schools. The chief purposes of the suggestions are to set forth the underlying principles upon which the teaching of the English language rests and to call attention to the language facts upon which special stress should be placed in both the home and the school.

Underlying Principles. The following underlying principles are applicable to all language teaching, and they will be referred to as occasion requires in the pages that follow:

1. *The child learns language by listening to his mother.*

As is the mother's speech so will be the child's. If the mother pronounces words correctly, and has a soft, melodious voice, the child will from the beginning form correct habits of speech.

2. *The child learns language from literature and song.*

The child who is taught the classic nursery rhymes of Mother Goose and other children's favorites and who listens to the sweet lullabies of childhood unconsciously lays the foundation of a good literary taste. "It is the ear and not the script or print," says Chubb, "that is the first, as it is the final, arbiter and nurse of all lovely speech and song."

3. *The child learns language by listening to his associates.*

The playground and the street are the great sources of discouragement to the teacher of language and to cultured parents. Some advocate excluding the child from these influences to prevent the corruption of his speech. But character is developed only through contact with one's fellows, and there is great danger that the child will lose more than he will gain by such exclusion. The difficuty to be overcome is not, however, as great as it at first seems, provided the early home training has been of the sort described above. The child who has formed right habits of speech in the home, and who is encouraged to use them, will slough off the bad forms learned in the street just as he outgrows many other childish habits in the progress of his natural development, unless by repeated cautions not to use these expressions they are kept before him.

4. *Language is only one means, and often a limited means, of expression. Its usefulness is increased by the development of other means, such as gesture, drawing and construction work.*

5. *Language and thought supplement each other.*

The language the child learns affects his thought and is a strong factor in the development of his character. In the language of the poet—

> This price the gods exact for song,—
> That we become what we sing.

It naturally follows that only the best in language and literature should be presented to children.

Language Work in the Home. The foundation of language is laid in the home, therefore we reiterate the first principle: *The child learns language by listening to his mother.* To this we wish to add another truth of almost equal importance: *Early habits may be overcome, but they are seldom, if ever, forgotten.* What are the mother's duties in leading the child to take his first steps in talking?

1. *To pronounce words correctly.* The child will reproduce what he hears, hence care should be exercised in pronouncing all words ending in *ing,* as *making, walking;* and such words as *been, sir, sure,* etc.

2. *To use correct language forms,* as *Whom* did you *see?* He *did* the work yesterday; I *saw* John last week; I *have no* money. Many

people through carelessness violate the rules of speech daily in such sentences as are given above. Their practice is not on a par with their knowledge. If the child hears these violations in the home he will use them, believing that they are correct, and when the wrong forms are once learned it is difficult to eradicate them.

3. *To avoid "baby talk."* Perhaps no other practice in the home does so much to corrupt the child's speech as indulging in the *"tootsie wootsie little manny"* talk in which many good people take delight. Those who consider the child's welfare will refrain from such expressions, once they realize their influence upon his language.

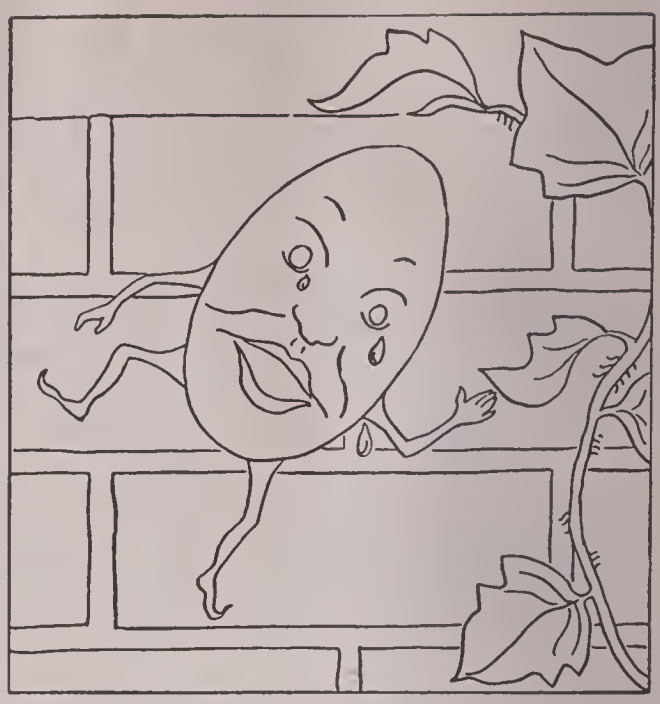
4. *To encourage the child to talk.* The child will talk all his life, and he should begin right. Children like to talk, but their chatter is too often suppressed by those who dislike to be "bothered." If simple words are used in conversation with the child he will soon learn them, and will use them in his conversation. Words difficult to pronounce and words whose meaning the child cannot understand should be avoided.

5. *To teach the child good literature.* A college professor once claimed that he could pick out his students who had learned *Mother Goose* melodies in childhood, by their use of language. Be this as it may, the value of the nursery rhyme, the nonsense jingle and the classic myth in laying the foundation of language is universally recognized. And unless these are taught in the early years when they appeal to the child's mind their influence will never be felt. Here are a few selections that every child should learn before his fifth year. The accompanying illustrations show what the mother may do to impress the story more strongly upon the mind. These selections should be taught incidentally as part of the child's play:

Little fishie in the brook,
Papa caught him with a hook,
Mamma fried him in a pan,
Baby ate him like a man!

Bye, baby bunting,
Father's gone a-hunting,
Mother's gone a-milking,
Sister's gone a-silking,
Brother's gone to buy a skin
To wrap the baby bunting in.

Pat-a-cake, pat-a-cake, baker's man,
Make me a cake as fast as you can;
Prick it and pat it and mark it with T,
And put it in the oven for Teddy and me.



HUMPTY DUMPTY

Humpty Dumpty sat on a wall;
Humpty Dumpty had a great fall,
And all the King's horses and all the King's men
Can't put Humpty Dumpty together again.

ROCK-A-BYE, BABY

Rock-a-bye, baby, in the treetop;
When the wind blows, the cradle will rock;
When the bough breaks, the cradle will fall;
Down will come baby, cradle and all.

Little Boy Blue, come, blow your horn;
The sheep's in the meadow, the cow's in the corn.
"Where's the little boy that looks after the sheep?"
"He's under the haystack, fast asleep."

DING, DONG, BELL

Ding, dong, bell,
Pussy's in the well!
Who put her in?
Little Tommy Linn.
Who pulled her out?
Big John Stout.

Little Miss Muffet
Sat on a tuffet,
Eating her curds and whey;
Along came a spider,
And sat down beside her
And frightened Miss Muffet away.

Little Bo Peep has lost her sheep
And can't tell where to find them;
Leave them alone, and they'll come home,
Wagging their tails behind them.

OLD KING COLE

Old King Cole
Was a merry old soul
And a merry old soul was he;
He called for his pipe,
And he called for his bowl,
And he called for his fiddlers three.
Every fiddler he had a fiddle,
And a very fine fiddle had he;
Twee, tweedle dee, tweedle dee,
Went the fiddlers three.
O! there's none so rare as can compare
With King Cole and his fiddlers three.

TWINKLE, TWINKLE, LITTLE STAR

Twinkle, twinkle, little star;
How I wonder what you are!
Up above the world so high,
Like a diamond in the sky.

When the glorious sun is set,
When the grass with dew is wet
Then you show your little light,
Twinkle, twinkle, all the night.

In the dark-blue sky you keep,
And often through my curtains peep;
For you never shut your eye
Till the sun is in the sky.

As your bright and tiny spark
Lights the traveler in the dark,
Though I know not what you are,
Twinkle, twinkle, little star!

6. *To coöperate with the teacher.* After the child enters school, the language training at home should be planned to fix in mind the lessons taught at school. In teaching all nursery rhymes and other selections care should be taken to teach them correctly. Many books contain revisions that differ widely from the original.

First Year. The child has the foundation for language when he enters school at five years of age. If he comes from a cultured home the foundation is well laid, and there should be no break between the work of the home and that of the school. Moreover, the work for the first year should be planned with a view to the work of the succeeding grades, so there will be no abrupt change in the language lessons as the pupil passes from one grade to another.

"All activities of the child may be made tributary to his training in English, since he is always doing something and telling about it." During the first year the work will be essentially oral. The teacher will be expected to follow the prescribed course of study, but the pupils should receive drill on the following points:

1. *Conversation Lessons.* "The teacher's prime duty is to make beautiful speech attractive." To this end children must be trained to talk, and that the desired results may be secured they must be made to feel so much at home that their speech will be spontaneous and natural. The creation of a homelike atmosphere in the schoolroom is essential to successful language lessons. If the teacher is natural and spontaneous, the pupils will follow her example.

The activities in the home, the stories the children know and those the teacher tells them, the birds, some of the common insects, simple flowers and plants, the reading lessons, the games the children play, and many other common experiences and pictures, may be drawn on for material for these lessons. The chief aim is to make good talkers—that is, so to guide the children that they will gain the power to tell what they know naturally and in logical sequence, and to express themselves in good English.

The first requisite is to fill the child's mind with ideas. All conversation lessons during the first and second years should be rich in content. The teacher should encourage the pupils to observe the objects about them and to tell what they see, feel and smell. She should lead them to extend their observations by careful questioning. Then before the lessons on any subject are dropped for something else, she should secure from each pupil just as complete a story as he can tell of what he has learned.

The nursery rhymes, stories and myths that the children have learned serve as excellent material for connecting the home with the school, since the pupils will be eager to tell what they know. These should be supplemented by many others during the year. The teacher should therefore be a good story-teller (see STORY-TELLING).

The most difficult task that confronts the teacher is that of securing correct forms of expression without suppressing the pupil's spontaneity. Criticism is necessary, but it must be given tactfully. The teacher who solves this problem successfully will solve without difficulty all other problems connected with her language work. The following suggestions will be found helpful:

(*a*) Be careful to use correct language. The pupils imitate your speech as well as your actions. If you use good language you are serving as a correct model.

(*b*) Emphasize correct forms by calling attention to them in such a way as not to embarrass the pupil. Ignore incorrect forms by not calling attention to them. When a pupil makes an error in telling his story it is best to let him finish, then ask him to tell it again and to try to say it as you do. In other words, your criticism should always be of such a nature as to lead the pupil to feel that you are helping him to say what he wants to tell in a better way.

2. *Reading.* Since this subject is discussed under its title, it is not necessary to give it space here further than to state that the reading lessons are vitally connected with the language lessons, and that they furnish much valuable material for language work.

3. *Written Work.* The child is always interested in doing something new, and some time during the first year the pupils should begin to write. Since writing is a form of expression, the writing exercises are closely related to the language lessons; when the pupils have had enough practice in writing to enable them to write two or more words, they may occasionally be called upon to write short statements, as *I saw a robin.* But the tendency is to introduce written exercises too early. Until the pupil has mastered the mechanics of writing, the act requires so much attention that it is impossible for him to express his thought. During the first year written exercises should be very brief, consisting at first of not more than one or two sentences. They may be increased in length towards the end of the year.

4. *Dramatization.* Children like to "act out" their stories and the little dramas that can easily be constructed out of such fables as *The Wind and the Sun* and *The Lion and the Mouse,* such poems as *Old King Cole* and

Queen of Hearts, and many simple stories. These exercises keep the pupils interested and also serve to strengthen their powers of expression. See DRAMA, page 1855.

5. *Material.* The best primers and first readers contain material of high literary value, but unfortunately many books of poems and prose selections for children and most of the educational journals publish much material for language and reading work that is decidedly below the standard approved by the best educators. Selections for memorizing and stories to be read or told to the pupils should be selected with the greatest care. When we have the works of the masters to draw upon, why seek inferior sources? The selections that follow are given as illustrations of the sort of material that should be selected:

The Queen of Hearts,
She made some tarts
All on a summer's day:
The Knave of Hearts,
He stole those tarts,
And took them clean away.

The King of Hearts,
Called for the tarts,
And beat the Knave full sore:
The Knave of Hearts
Brought back the tarts,
And vowed he'd steal no more.

The Swing

ROBERT LOUIS STEVENSON

How do you like to go up in a swing,
  Up in the air so blue?
Oh, I do think it the pleasantest thing
  Ever a child can do!

Up in the air and over the wall,
  Till I can see so wide,
Rivers and trees and cattle and all
  Over the countryside—

Till I look down on the garden green,
  Down on the roof so brown—
Up in the air I go flying again,
  Up in the air and down!

What Does Little Birdie Say?

ALFRED TENNYSON

What does little birdie say,
  In her nest at peep of day?
"Let me fly," says little birdie,
  "Mother, let me fly away."
Birdie, rest a little longer,
Till the little wings are stronger.
So she rests a little longer,
  Then she flies away.

What does little baby say,
  In her bed at peep of day?
Baby says, like little birdie,
  "Let me rise and fly away."
Baby, sleep a little longer,
Till the little limbs are stronger.
If she sleeps a little longer
  Baby, too, shall fly away.

Seven Times One

JEAN INGELOW

There's no dew left on the daisies and clover,
  There's no rain left in heaven:
I've said my "seven times" over and over,
  Seven times one are seven.

I am old, so old I can write a letter;
  My birthday lessons are done;
The lambs play always, they know no better;
  They are only one times one.

O moon! in the night I have seen you sailing
  And shining so round and low;
You were bright! ah, bright; but your light is failing—
  You are nothing now but a bow.

You moon, have you done something wrong in heaven
  That God has hidden your face?
I hope if you have you will soon be forgiven,
  And shine again in your place.

O velvet bee, you're a dusty fellow,
  You've powdered your legs with gold!
O brave marsh marybuds, rich and yellow,
  Give me your money to hold.

O columbine, open your folded wrapper,
  Where two twin turtle-doves dwell!
O cuckoopint, toll me the purple clapper
  That hangs in your clear green bell!

And show me your nest with the young ones in it;
  I will not steal them away;
I am old! you may trust me, linnet, linnet—
  I am seven times one to-day.

The Fox and the Crow

A Fox once saw a Crow fly off with a piece of cheese in its beak and settle on a branch of a tree.

"That's for me, as I am a Fox," said Master Renard, and he walked up to the foot of the tree.

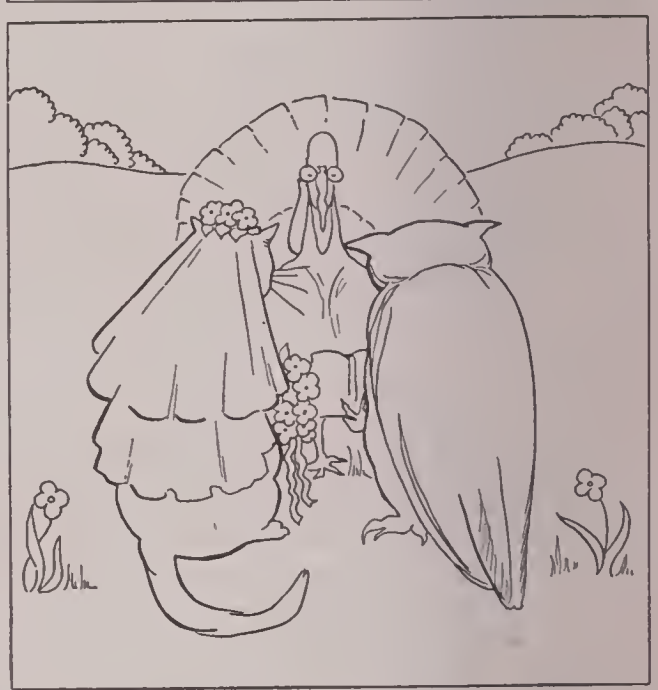
"Good-day, Mistress Crow," he cried. "How well you are looking to-day; how glossy your feathers; how bright your eye. I feel sure your voice must surpass that of other birds, just as your figure does; let me hear you sing, that I may call you queen of birds."

The Crow lifted up her head and began to caw her best, but the moment she opened her mouth the piece of cheese fell to the ground, only to be snapped up by Master Fox.

"That will do," said he. "That was all I wanted. For your cheese I will give you a piece of advice: Do not trust flatterers."

The Owl and the Pussy-Cat

The Owl and the Pussy-Cat went to sea
  In a beautiful pea-green boat;
They took some honey, and plenty of money
  Wrapped up in a five-pound note.
The Owl looked up to the stars above,
  And sang to a small guitar,
"Oh, lovely Pussy! Oh, Pussy, my love!
  What a beautiful Pussy you are!"



THE OWL AND THE PUSSY-CAT

Pussy said to the Owl, "You elegant fowl!
How charmingly sweet you sing!
Oh, let us be married—too long we have tarried—
But what shall we do for a ring?"
They sailed away for a year and a day
To the land where the Bong-tree grows,
And there in a wood a piggy-wig stood
With a ring in the end of his nose.

"Dear Pig, are you willing to sell for one shilling
Your ring?" Said the piggy, "I will."
So they took it away, and were married next day
By the turkey who lives on the hill.
They dined upon mince and slices of quince,
Which they ate with a runcible spoon,
And hand in hand on the edge of the sand
They danced by the light of the moon.

Second Year. The work of the second year is a continuation of that already outlined for the first year. The amount of written work should be increased; the child's ability to describe what he sees and hears should be doubled, and the selections learned should be longer and more directly connected with character building. The lines of work suggested for the previous grade should be continued. More attention should be given to details such as capitals and periods in writing, and the use of correct forms of pronouns and verbs.

1. *Oral Composition.* This is the most important line of work for the second and third years. If children speak correctly they will write correctly, unless they become confused by the mechanics of writing. But on the other hand, because children (or adults, for that matter) may write correct English, it does not follow that they will speak correctly. We should therefore place all possible emphasis on securing fluency and accuracy of speech.

The two chief essentials to good oral composition are that the child has something to tell and someone to whom he wants to tell it.

Subjects in which the pupils were interested the first year should be taken up again this year and enlarged upon, but the teacher must keep the lessons within the capacity of the pupils, or they will soon lose interest and enthusiasm. The teacher will find a wealth of material for language lessons in these volumes. The article BIRD, for example, and its related topics give an idea of the abundance of material which the work contains. Look up in a similar manner ANT; BEE; DICKENS, CHARLES; LONGFELLOW, HENRY W., and the programs for special days.

2. *Picture Study.* Excellent lessons can be based on the study of pictures. The pictures

should be such as will interest the children. Pictures of children and of animals and birds, provided they show action, can be used most successfully. The picture shown here is one of that sort. The little foreign children and the geese are all in motion and all seem to be happy. Study the expression on the children's faces. Notice the natural poise of each figure and the man on the curb holding the baby. The background suggests a village street as the scene of the play. Ask the pupils to give each child in the picture a name. Learn what the children know about geese, and if they do no not know about them give them the desired information (see GOOSE). These are Dutch children, and the teacher should tell the pupils how children take care of geese in Holland.

A HOLLAND SCENE, FOR PICTURE STUDY

Each child may be allowed to make up his own story about the picture, and finally one story may be agreed upon by the class as the story that shall be told. The study should occupy several recitation periods.

3. *Written Work.* The best results in written work are obtained in this year, if most of it is done by dictation. Let the pupils dictate for the teacher, who will write on the board what they say. In this way they learn how their expressions appear in written form. Let the pupils do most of their writing on the board (see PENMANSHIP), with occasional exercises on paper. The main purposes of these exercises are (1) to secure expression of thought in correct written form, and (2) to gain facility in writing. Pupils should never be asked to write anything until they have recited it over and over so that they are perfectly familiar with it. All written work during the second year should consist of statements in the form of simple sentences; as—

The apple is red.
The ball is round.
The flower is pretty.

4. *Selections for Memorizing.* The following selections are types of the material suitable for second year language work. While children memorize readily at this time, systematic training in memorizing is necessary. They should memorize accurately, and the teacher should see that they know the meaning of the selection before they memorize it. Generally the pupils should tell the fables and other short stories in their own words, but poems should not be so treated.

Where Go the Boats?

ROBERT LOUIS STEVENSON

Dark brown is the river.
Golden is the sand.
It flows along forever,
With trees on either hand.

Green leaves a-floating,
Castles of the foam,
Boats of mine a-boating—
Where will all come home?

On goes the river
And out past the mill,
Away down the valley,
Away down the hill.

Away down the river,
A hundred miles or more,
Other little children
Shall bring my boats ashore.

Autumn Fires

ROBERT LOUIS STEVENSON

In the other gardens
And all up the vale,
From the autumn bonfires
See the smoke trail!

Pleasant summer over
And all the summer flowers,
The red fire blazes,
And the grey smoke towers.

Sing a song of seasons!
Something bright in all!
Flowers in the summer,
Fires in the fall!

The Brown Thrush

LUCY LARCOM

There's a merry brown thrush sitting up in a tree;
"He's singing to me! He's singing to me!"
And what does he say, little girl, little boy?
"Oh, the world's running over with joy!
Don't you hear? Don't you see?
Hush! look! In my tree
I'm as happy as happy can be!"

And the brown thrush keeps singing, "A nest do you see,
And five eggs hid by me in the juniper tree?
Don't meddle! don't touch! little girl, little boy,
Or the world will lose some of its joy!
Now I'm glad! now I'm free!
And I always shall be,
If you never bring sorrow to me."

So the merry brown thrush sings away in the tree,
To you and to me, to you and to me;
And he sings all the day, little girl, little boy,
"Oh, the world's running over with joy!
But long it won't be,
Don't you know? Don't you see?
Unless we're as good as can be."

The Goose That Laid the Golden Eggs

Once upon a time there lived a man who had a handsome Goose that every day laid a large golden egg. The man thought the Goose must have much gold inside of her, and so one day he wrung her neck, and found that she was just like any other Goose. Thinking to find wealth, he lost the little he had.

Third Year. 1. *The Textbook.* The third year is often a critical time in language work, for most courses of study call for the introduction of a textbook, either at the beginning or in the middle of the year. However meritorious the textbook may be it is at first a stumblingblock to the pupil—a new tool which he has not learned how to use. It is the teacher's first duty to become thoroughly familiar with the book. She should know its plan and scope so well that she can readily adapt it to the class. Doubtless several preliminary lessons will be necessary before the book is regularly taken up. Most language books now in use are well planned, and when the book is introduced its plan should be followed, otherwise the pupils will become confused. This does not mean, however, that the lines of work pursued in the previous years should be abandoned. The textbook should be a means of giving more definite plans for the continuance of this work.

2. *Oral Composition.* The work in oral composition should be greatly amplified during the third year. The pupils can now describe quite fully and accurately flowers, clouds, animals and other natural objects. They will also be able to tell how a house is built, what is found in a grocery store, and to describe many of the occupations common to the locality. They can now reproduce such stories as *Golden Locks and the Three Bears, Cinderella* and *Little Red Riding Hood.* A goodly number of myths and fairy tales should be given them, the longer ones being told or read by the teacher without any thought of their reproduction on the part of the pupils. Criticism can now become more pointed, and the pupil may be stopped in the midst of his recitation and asked to correct his language without the danger that such interruptions will affect his fluency, provided it is done in a kindly spirit. At this age pupils are likely to wander from the subject, and this tendency should be checked as soon as it appears. Encourage the children to be natural.

The teacher can find no better source of material for this work than in these volumes. History stories and stories of the boyhood of great men should be introduced this year.

3. *Written Work.* The pupils should now be able to give short, connected accounts, in writing, of what they learn, and the written exercises should be increased in frequency and in length. To the exercises in original composition should be added exercises in copying stanzas of poetry and short paragraphs from the reader or other books. These exercises should be brief, but the teacher should insist upon accuracy. The work here suggested is supposed to be supplementary to the exercises given in the language book. Many written

exercises admit of illustration, and the pupils should be encouraged to draw them, since each mode of expression aids the other.

4. *Letter Writing.* All the writing that most of the pupils will do after they leave school will consist in writing letters, and exercises in letter writing can be given with profit in the third year. The letters should be brief, and should be written to some one whom the writer knows, and for a specific purpose. A boy, for instance, may write to his father or brother asking for something he needs. See LETTER WRITING.

Perhaps a word of caution will not be out of place at this point. While we have placed increased emphasis upon the written work for this year, we would not convey the idea that written exercises should constitute the greater part of the pupils' work in language. These exercises are a means to an end, and they should not be made burdensome. The oral work should receive by far the greater amount of time all through this and the following year.

5. *Selections for Memorizing.* The poems and stories this year should be of such nature as to strengthen the character. Longfellow's *Children's Hour, The Day Is Done, The Builders,* many of the poems of Robert Louis Stevenson and Alice and Phoebe Cary, George Macdonald's *The Baby,* and Moore's *A Visit from Saint Nicholas* are good examples of suitable poems. In addition to the history stories and biographies already referred to, *Robinson Crusoe, Hans and Grethel* and *The Ugly Duckling* are good types of tales that may be read or told.

Fourth Year. The work of this year is practically an expansion of the work of the third year. The pupil is gaining more and more from his textbooks as he learns how to use them. The work in geography should now be used as a source of new material. Children are always interested in the children of other lands, and the study of child life in other countries at this time will prove interesting and profitable.

1. *Oral Composition.* The pupils should now begin to understand the difference between telling a story and describing an object. The importance of arranging what they tell in a natural order should also be constantly kept before them. They should be asked to tell in their own words stories that they have read, to describe places they have visited and people whom they have seen. The clouds, the wind, rain, snow and storms should be studied and described. Pupils will take great pleasure in describing such events as Wolfe's capture of Quebec, Braddock's expedition, with special emphasis on the part taken by Washington, the settlement of Jamestown and Plymouth. The material for this work is so abundant that the problem for the teacher is merely one of selection.

2. *Use of the Dictionary.* The pupils should be provided with a small dictionary at the beginning of this year and should be taught how to use it. Of the many dictionaries on the market only two are worthy of consideration—*Webster's International* and the *Standard.* Small dictionaries bearing the imprint of the publishers of either of these great works are standard, differing from the larger works chiefly in amount of information they contain. The teacher should give frequent lessons upon its use until they have become familiar with the book.

3. *Study of Selections.* The school reader will furnish many valuable language lessons, since many of its selections are worthy of special study. Longfellow's *Paul Revere's Ride* is an example of such a selection. It is not enough merely to read the poem. The events of which it treats should be studied, a map of the region over which Revere rode should be drawn, and the beautiful pictures in the poem should be described by the pupils in their own words. Finally, the poem should be memorized. The course of study will determine the amount of this sort of work that can be done.

4. *Written Work.* The amount of written work should be increased and special attention should be given to the use of correct forms of verbs and pronouns, and to the common errors of speech that are likely to creep into written work. The pupil is now old enough to begin to understand why he should use certain forms and why he should never use others. The exercises should be lengthened, and the pupils should be led to rely upon themselves, but still the oral work should receive the greater amount of attention. Letter writing should be emphasized.

Fifth Year. The practical phase of the work should be emphasized throughout the year. That is, the business vocabulary of the pupils should be extended, and the correct use of common business terms, such as *merchandise, gain, loss, interest, commission* and *percentage* should be learned. Were it not for the fact that at the end of this year many of the pupils will leave school, these terms could be left

until the next year. They should be so taught as to lead the pupils to realize the vital relation between language and arithmetic. It is unnecessary to repeat here what has been said about oral and written work in the previous years. Some new phases, however, should now be introduced.

1. *Study of the Sentence.* The pupils may have learned some of the parts of speech, as *noun, verb, pronoun.* They may also have learned the parts of a sentence. Be this as it may, they should now learn the importance of the sentence in both oral and written expression—that unless one expresses himself in sentences he says nothing in speaking or in writing. Perhaps lack of sufficient drill upon the sentence is the greatest weakness in the language work of the public schools. Only the foundation facts, that the essential parts of a sentence are subject and predicate, that the subject and predicate must agree in person and number, and that in some sentences a third part, the object, must be added to complete the meaning, should be taught in this year; but these great sentence facts should be dwelt upon until the pupils thoroughly understand them. Some special drill exercises will be necessary to secure the desired results, but most of this study should be in connection with the lines of work already explained.

2. *Explanations.* Some teachers carry explanations in arithmetic to the extreme, and when explanations are mentioned they immediately think of those associated with that study. An entirely different sort of an explanation is meant here. Some boy knows how to make a kite; let him explain to the class how it is done. Assign the exercise two or three days in advance, so that he may have time to prepare for it, then expect a complete explanation, and allow the members of the class to ask such questions as may be necessary to give them a clear understanding of the subject. Ask a girl to explain how to cover a book, or to make bread; use many common occupations for material. The value of these exercises consists in the training they give in orderly arrangement of the subject on part of the pupil, in leading to conciseness and definiteness of statement and in thorough preparation on the subject. They lead the pupil to talk before the class without suffering from a self-consciousness that will deprive him of all fluency in his recitation. The explanation is the first step in a series of exercises which should lead the pupils to become so proficient in oral composition that they can discuss in public any question that they understand.

3. *Correspondence.* Letter writing should develop into correspondence this year. The lessons in geography and history may be used as the basis for this work. Pupils may write letters describing some foreign country or a distant city. The writer should assume that he is living in the place described, and he should be encouraged to put as much of his personality into the letter as he can. History pupils may assume that they are living in the time studied, as, for instance, the time of the Revolutionary War; now and then some pupil may impersonate one of the characters of history and write the class a letter expressing his views on some topic that was a live question of that day. Some such plan as this gives definiteness to the correspondence and affords excellent training in the use of the imagination.

Sixth Year. If pupils have been properly trained in English they should be able to speak and write with only occasional errors when they enter upon their sixth year's work. The errors will, in the main, be peculiar to certain pupils, and the teacher can help herself in securing their correction by keeping a sort of card index of these errors. To illustrate:

Andrew Johnson: Omits *g* from such words as *morning.* Uses *seen* for *saw* and *them* for *they.*

Tom Brown: Uses *done* for *did.* Subjects and predicates do not agree in person and number.

These cards enable the teacher to recall at a glance just what faults should receive attention in the work of each pupil, and by persistent effort she will be able to correct most of such errors during the year. The work of the fifth year should be expanded. More extended study should be given the sentence. All the parts of speech should be learned, the parts of a complex sentence studied, and the difference between complex and compound sentences should be taught.

1. *Business Letters and Forms.* The pupils should write letters applying for positions, ordering goods, asking payment for debts past due, and letters to accompany remittances in payment of bills (see LETTER WRITING, subhead *Business Letters*). Special attention should be given to form, punctuation and language. Impress upon the pupils the prestige that ability to write a good business letter gives a person. Pupils should receive such training in writing promissory notes and receipts as will enable them to write them correctly (see NOTE; RECEIPT).

2. *Talks before the School.* Great interest can be added to the morning exercises by having different pupils give talks of two or three minutes on subjects in which pupils of this grade are interested. One boy may tell how shoes are made; a girl may tell about the home of Louisa M. Alcott, and possibly describe one of her books; another may tell about the robin or some other bird common to the locality. An abundance of material for these talks may be found in these volumes. Two or three talks a week can easily be arranged. In giving them the pupil has only taken a step in advance of explaining a subject to the class, and the benefit derived from the exercise is well worth the time and effort required.

3. *The Study of Literature.* Pupils now have enough power of discrimination to study with profit some of the best literature. This will enable them to enrich their vocabularies and to become so familiar with the figures of speech that they will use them in their conversation and oral composition. Teachers sometimes fail to secure the results expected because they choose too difficult selections. A selection for critical study should be easily understood by the pupils, otherwise so much thought must be given to the interpretation that there is little left for analysis. Moreover, a thorough study of a selection which the pupil thinks he knows perfectly will usually bring out meanings that he never thought of. Bryant's *Gladness of Nature,* Lowell's *The First Snowfall* and Longfellow's *A Psalm of Life* are good examples of poems suitable for study during this year, and Hawthorne's *Tales of the White Hills,* Dickens' *Christmas Carol* and Irving's *Rip Van Winkle* and *Legend of Sleepy Hollow* serve as good examples of what may be used. Care should be taken not to make the study cover so many details that the pupils will tire of the selection before it is completed.

Seventh and Eighth Years. The additional work of these years should consist in the study of formal grammar (see GRAMMAR). Additional facilities for written and oral expression should be given. In connection with this work the word *composition* should be avoided. Pupils write without hesitation *exercises* to which their work naturally leads, but *composition* usually suggests something formal and dreadful. Doubtless they have been writing compositions all these years without realizing it.

1. *Debates.* Every boy by the time he has reached the age of twelve likes to engage in argument, so an occasional debate should constitute a feature of the seventh year's work. The argument, like the explanation, leads to logical arrangement of his discourse on part of the pupil, and also to thorough preparation. Subjects chosen should always be within the grasp of the pupils, and within the range of their interests. Such questions as why the new schoolhouse should have an assembly hall, or why the school grounds should be enlarged, will secure a lively debate in which the pupils will freely express their opinions.

2. *The Literary Society.* Much interest can be added to the work in language during the eighth year by the organization of a literary society or club, to be managed by the pupils under supervision of the teacher. For plan for organizing and conducting such a society, see PARLIAMENTARY LAW. W.F.R.

Related Subjects. The following articles in these volumes have to do with the general subject of language study. Some of them are more closely related to the more formal topic of grammar, but the line of division is not sharply drawn:

Adjective
Adverb
Article
Case
Comparison
Conjugation
Conjunction
Debate
Declension
Dictionary
Etymology
Gender
Grammar
Infinitive
Inflection
Interjection
Letter Writing
Literature
Mode
Noun
Parsing
Participle
Parts of Speech
Penmanship
Person
Preposition
Pronoun
Punctuation
Quotation Marks
Sentence
Story-Telling
Syntax
Tense
Verb

LANGUAGES OF THE WORLD. Occasionally some man appears who makes it his life work to set forth the advantages that would follow if all the world spoke one tongue; consequently, several "universal languages" have been evolved. There is Volapük, or "world speech," which dates from 1879; it was the inspiration for international congresses and found supporters in every civilized country; there is also Esperanto, which still thrives and has grammars and periodicals devoted to it; there is "idiom neutral," an outgrowth of Volapük, which is considered to be so simple that an educated reader can master it well enough to read it within a few hours.

Some of the advocates of these universal tongues are so enthusiastic and so hopeful that they believe it would actually be possible, though a slow process, to supplant other lan-

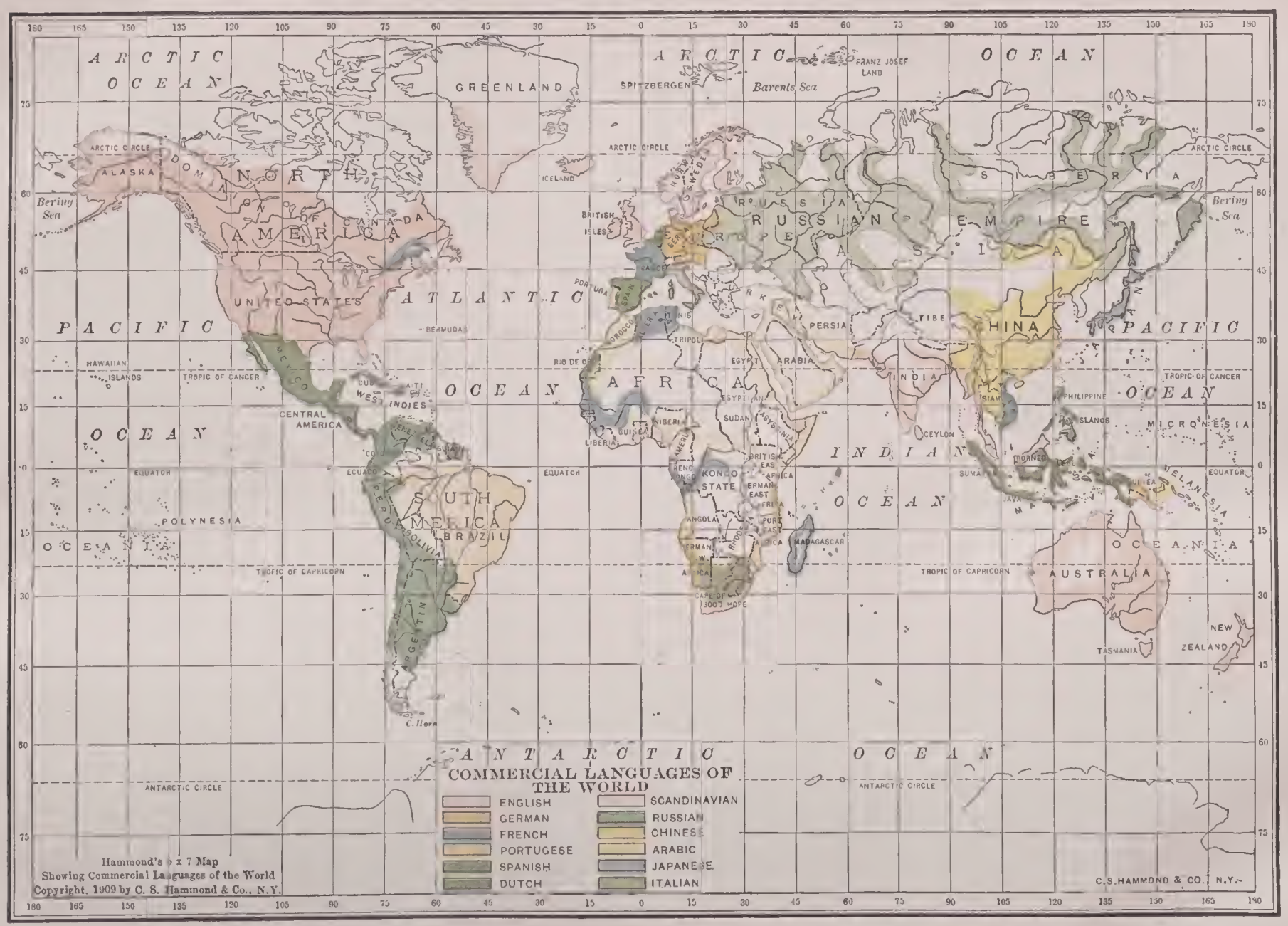
guages and in time have a real "world speech," at least for Europe and America; but the more conservative persons merely aim to produce a speech which shall be used for international purposes only and exist side by side with the languages of the various countries. But whatever the object, it has persistently failed of success. The new, invented language may be more reasonable, more logical than those already in existence, but it is not and cannot be vital. No people's life is woven into it; no contacts and withdrawals are shown in it, and the articles in these volumes on the various languages the chief characteristics of each are pointed out—the musical quality of Italian, the delicacy and precision of French, and so on.

Many men have given their lives to the study of languages, and to classifying them. There are languages in which no word has more than one syllable, like the Chinese; and on the other hand there are those, like the German, which contain ponderous words of seven or eight syllables. There are tongues, belonging almost entirely to comparatively undeveloped

LANGUAGE	WHERE SPOKEN	BY HOW MANY PEOPLE
Basque	Southern France and Northern Spain	440,000
Bohemian, or Czech	Nowhere the official language, but spoken by over 6,000,000 in Austria. The United States has the second largest number of Czechs—500,000; and Germany has 125,000	7,100,000
Bulgarian	Bulgaria and Eastern Rumelia	5,650,000
Chinese	China. Of course there are in this vast country many dialects	400,000,000 (estimated)
Danish	Denmark and Northern Schleswig	about 3,500,000
Dutch	Netherlands, and by the Boers of South Africa. The language of these latter is, however, a strongly marked dialect	6,000,000
Egyptian	Egypt. Almost one-tenth of the population, Arabs, Turks, Greeks, British, speak other languages	about 10,500,000
English	The United Kingdom, Canada, the United States, Australia, and officially, in the various British colonies, as India, South Africa	160,000,000 (at least)
Flemish	Northern provinces of Belgium	about 3,500,000
French	France and its colonies. There are also about 3,000,000 French-speaking people in Belgium, about 750,000 in Switzerland, and about 2,125,000 in Canada	52,000,000 (at least)
German	German Empire, Luxemburg, Switzerland, and parts of Austria-Hungary. There are also many German-speaking people in other countries, as Russia and the United States, so that the total is about	80,000,000
Greek	Greece, large parts of Asia Minor, Cyprus, Crete	about 9,000,000
Hindustani	Northern India	100,000,000
Italian	Italy, with its islands, and some parts of Austria, Switzerland and France	37,000,000
Japanese	Japan	53,000,000
Norwegian	Norway	2,400,000
Persian	Persia	9,500,000
Polish	The regions comprising the former kingdom of Poland, but now part of Russia, Austria-Hungary and Prussia. There are also about 1,000,000 Polish-speaking people in America	16,000,000
Portuguese	Portugal, Brazil and various Portuguese colonies	26,200,000
Russian	Russian Empire and parts of Galicia and Hungary	95,000,000
Serbo-Croatian	Serbia, Montenegro, Croatia, Slavonia, Bosnia and Herzegovina, and Southern Hungary	8,000,000
Spanish	Spain, Mexico, Central America, much of South America, the Philippines and the Antilles	50,000,000
Swedish	Sweden	5,500,000

there remain, instead of the *language* of the world, the *languages* of the world, as sharply differentiated as ever in their history. For each expresses in a large degree the genius and spirit of the people who built it.

Kinds of Languages. The fact stated above will bear emphasis—that the history of a people is legible in its language; and the greatest nations, those which have swayed the destinies of the world, have fashioned the greatest languages. The language of Greece was exquisite, musical, as truly a work of art as any statue ever hewn from marble; the Roman language was strong, compact, as capable of accomplishing its purpose as was the Roman legion. In peoples, which make use of but a few sounds, and there are others, as English, which have more than twoscore. Then there are divisions according to grammatical structure, as languages which inflect their words to show varying relations, and languages which have slight inflection or none at all. However, all of these technical distinctions are the province of the scholar; the ordinary reader, even the ordinary student, has little interest in them. On the other hand, he is interested in such questions as, How many languages and dialects are there in the world? How many sounds or articulations are there in all of them? Which language is spoken by the most people? Which


COMMERCIAL LANGUAGES OF THE WORLD
ENGLISH
GERMAN
FRENCH
PORTUGESE
SPANISH
DUTCH
SCANDINAVIAN
RUSSIAN
CHINESE
ARABIC
JAPANESE
ITALIAN
Hammond's 5 x 7 Map
Showing Commercial Languages of the World
Copyright, 1909 by C. S. Hammond & Co., N.Y.
C.S.HAMMOND & CO. N.Y.
ARCTIC OCEAN
ATLANTIC OCEAN
PACIFIC OCEAN
INDIAN OCEAN
ANTARCTIC OCEAN
GREENLAND
SPITZBERGEN
FRANZ JOSEF LAND
Barents Sea
Bering Sea
ARCTIC CIRCLE
ALASKA
NORTH AMERICA
DOMINION OF CANADA
UNITED STATES
MEXICO
CENTRAL AMERICA
WEST INDIES
SOUTH AMERICA
BRAZIL
BOLIVIA
ARGENTINA
C. Horn
BERMUDAS
HAWAIIAN ISLANDS
TROPIC OF CANCER
EQUATOR
POLYNESIA
OCEANIA
TROPIC OF CAPRICORN
ANTARCTIC CIRCLE
ICELAND
BRITISH ISLES
PORTUGAL
SPAIN
NORWAY
SWEDEN
RUSSIA
EUROPE
RUSSIAN EMPIRE
ASIA
SIBERIA
TURKEY
PERSIA
TIBET
CHINA
JAPAN
INDIA
SIAM
PHILIPPINE ISLANDS
MICRONESIA
MELANESIA
CEYLON
SUMATRA
BORNEO
JAVA
AUSTRALIA
TASMANIA
NEW ZEALAND
AFRICA
TRIPOLI
EGYPT
ARABIA
SUDAN
NIGERIA
LIBERIA
GUINEA
KONGO STATE
ANGOLA
MADAGASCAR
CAPE OF GOOD HOPE

is spoken in the most countries? Which is spreading most rapidly?

First of all, it is estimated that there are in the world over 5,000 languages and dialects. Certain of the dialects, to be sure, differ from each other very slightly, but some of the languages are as far apart as is civilization from savagery. And in all these tongues there are no fewer than 300 different articulations—300 ways in which the vocal organs must be used to produce sounds. Some of the more primitive tongues make use of but a very few, sounding to the unaccustomed ear almost like a series of grunts; while English, on the other hand, uses almost fifty. Probably no language, unless it was the ancient Sanskrit, has ever made use of more.

The Chief Languages. As to the number of people speaking the various important tongues, and the countries in which they are spoken, the table on page 3326 gives such information in compact form. No account is taken of the languages of savage tribes, which have received comparatively little study, and concerning which no estimates can be given.

From this table it may be seen that Chinese is spoken by more people than any other language in the world. English ranks next, and is thus first among the European languages. Of these Russian is second and German third, but both of these are less widespread than Hindustani.

It is an interesting fact that the languages of all the most important peoples of the world, except the Chinese and Japanese, belong to one great family, the Aryan or Indo-Germanic group of languages. Tongues as different as Hindustani, Russian and English are all members of this group, which includes every tongue of Europe except the Basque, which is unrelated, so far as anyone knows, to any other language. *Ex oriente lux,* a popular saying meaning *Light out of the East,* may thus apply not only to religion but to language as well, for just as every great religion of the world originated in Asia, so, it is believed, did the one parent tongue from which all the Aryan languages are sprung have its first home in Asia, the continent of beginnings. A.MC C.

Related Subjects. The important languages of the world are treated in separate articles in these volumes:

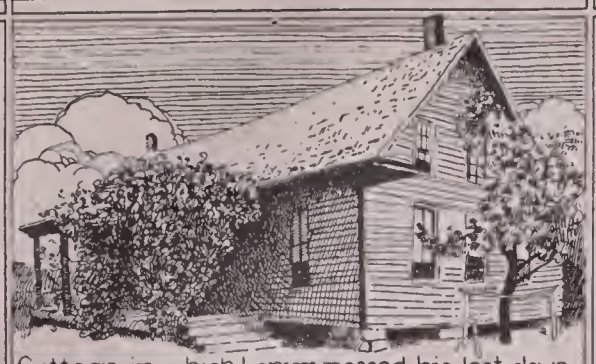
Bengali
English Language
Esperanto
Flemish Languages and Literature
French Language
German Language
Greek Language
Hebrew Language and Literature
Hieroglyphics
Italian Language
Latin Language
Plattdeutsch
Provençal Language and Literature
Romance Languages
Sanskrit Language and Literature
Sign Language
Syriac
Volapük

LANIER, *la neer',* SIDNEY (1842-1881), the greatest poet of the South since Edgar Allen Poe. He is called the "sunrise poet," so deeply did he love and so truly did he interpret the freshness, the hush, the misty twilight spell of the early morning hours. His verse was the product of his theory that poetry, like music, should appeal to the ear, and like that of Poe it represents a melodious blending of sound and sense. He was a prose writer of note also, and is known to children for his adaptation of the *Mabinogion,* the chronicles of Froissart, and the story of King Arthur, and for such delightful sketches as *Bob: The Story of Our Mocking Bird* and *The Story of a Proverb.* His fame has grown steadily since his death, and the North as well as the South honors his genius.

Lanier was born in Macon, Ga., and educated at Oglethorpe College, in that state. During the War of Secession he fought on the Confederate side, and while a prisoner he wrote some of his first verses. From the exposures and hardships of war he developed consumption, which he fought heroically into middle life, but it finally caused his death.

His literary career began in 1867, with the publishing of an unsuccessful novel, *Tiger Lilies,* founded on his war experiences. One of his first poems, *Corn,* appeared in *Lippincott's Magazine* in 1875 and attracted so much attention that he was asked to write the words to a cantata composed by Dudley Buck and sung at the Centennial Exposition. The first complete edition of his poems appeared in 1876. In 1879 he was appointed lecturer on English literature at Johns Hopkins University, and during his engagement there he published two critical volumes of considerable importance: *Science of English Verse* (1880), and *The English Novel and the Principles of Its Development* (1883). The latter is composed of lectures delivered at Johns Hopkins at a time when he was so weak he had to sit during his talks.

Lanier's finest and most spiritual work is the *Hymns of the Marshes,* two of which, *Sunrise* and *The Marshes of Glynn,* are the wonderful imaginative songs of a dying man. These *Hymns* rank among the best productions of American poetry. His *Song of the Chatta-*



Cottage in which Lanier passed his last days

Lanier's Birthday

SUGGESTIVE PROGRAM

The program as here given is of course too long. It will be necessary to make selection.

Song, *Ballad of Trees and the Master* .....*Lanier*
Roll Call, Quotations from Lanier
Owl against Robin.....*Lanier*
Essay, *Sketch of Lanier's Life*
The Tournament.....*Lanier*
By two pupils
Reading, *The Story of a Proverb*.. ..... *Lanier*
Barnacles .....*Lanier*
Essay, *Comparison of Lanier with Other Southern Poets*
Essay, *Lanier the Musician*
Song of the Chattahoochee....*Lanier*
Essay, *Heroes of Peace*
The Better Way.....*Susan Coolidge*
Reading, *Bob: The Story of Our Mocking Bird* .....*Lanier*
The Hard Times in Elfland....*Lanier*
Essay, *The Founding of the Round Table*
Character Sketch of King Arthur
Life and Song.....*Lanier*
The First Steamboat Up the Alabama .....*Lanier*
Essay, *Description of the Marshes of Glynn*
Tampa Robins.....*Lanier*
Dying Words of Stonewall Jackson ..... *Lanier*
Essay, *What Lanier Stands for in the Life of the South*

"The Sunrise Poet"

hoochee, A Song of the Future, A Song of Love, An Evening Song and others are songs in the true, literal sense.

The following lines from his *Marshes of Glynn* are representative of the quality of his verse:

And what if behind me to westward the wall of the wood stands high?
The world lies east: how ample, the marsh and the sea and the sky!
A league and a league of marsh-grass, waist-high, broad in the blade,
Green, and all of a height, and unflecked with a light or a shade,
Stretch leisurely off, in a pleasant plain,
To the terminal blue of the main.

LANSDOWNE, *lanz'doun,* HENRY CHARLES KEITH PETTY-FITZMAURICE, Fifth Marquis of (1845-), a contemporary British statesman, one of that small group of men who are taught from boyhood to take a leading part in public life. He was educated at Eton and at Balliol College, Oxford, and succeeded to the family estates and titles in 1866, when he was only twenty-one. Thus elevated to the House of Lords at an age when most young men are finishing their schooling, he lost no time in making his influence felt. In various Liberal Ministries he was in turn a Lord of the Treasury (1869-1872), Undersecretary of State for War (1872-1874) and Undersecretary of State for India (1880). His resignation from the last office was a sharp protest against Gladstone's policy toward Ireland, and when Gladstone in 1886 finally espoused Home Rule, Lansdowne was one of those who joined the Liberal Unionist party.

LORD LANSDOWNE

In the meantime Lansdowne had been appointed Governor-General of Canada to succeed the Duke of Argyle (Marquis of Lorne). His tenure of this office, from 1883 to 1888, was marked by considerable internal progress, notably the completion of the Canadian Pacific Railway. The Saskatchewan, or Riel, Rebellion and the arbitration of the fisheries dispute with the United States were other noteworthy features. After five years in Canada Lansdowne spent five years in India as Viceroy.

From 1895 to 1900 he was Secretary of State for War in Salisbury's Cabinet, and from 1900 to 1905 was Secretary for Foreign Affairs. His service at the Foreign Office was marked by the alliances with Japan and France.

After 1905 Lansdowne became leader of the Unionist opposition in the House of Lords. Although nominally a Liberal in early life, he was temperamentally conservative, a fact which was strongly revealed in 1909, when he bitterly opposed the Lloyd George budget, and in 1916, when his opposition defeated Lloyd George's compromise of the Home Rule question. In May, 1915, Lord Lansdowne entered the coalition Ministry, formed by Premier Asquith, as Minister without portfolio. With the fall of the coalition Cabinet and the ascendancy of Lloyd George, Lord Lansdowne retired to private life. If his half century of public service did not give him a place in English history as the equal of Gladstone or Disraeli, it at least entitles him to high rank among those men who have given their lives in public service. C.H.H.

LANS'FORD, Pa., a borough in Carbon County, situated in the eastern part of the state about midway between the northern and southern boundary lines. It is forty-four miles north of Reading and on the Pennsylvania and the Central of New Jersey railroads. The prosperity of Lansford is derived mainly from the productive anthracite-coal district in which it is located. Besides its extensive coal-mining interests, it has manufactories of garage supplies, shirts and silk knit goods. An immense electric-power plant is located about a mile from the borough. Lansford was settled in 1845 and was incorporated in 1876. In 1910 the population was 8,321; in 1916 it was 10,477 (Federal estimate).

LAN'SING, Mich., the capital of the state and the county seat of Ingham County, is situated south of the geographical center of the state, at the point where the waters of the Grand and Cedar rivers meet. Detroit is eighty-five miles southeast and Grand Rapids is sixty-four miles northwest. Transportation is provided by the Grand Trunk, the Michigan Central, the New York Central, the Pere Marquette and the Michigan United Traction Company. The first settlement on the site was made in 1837; it was chosen for the state capital in 1847, chartered as a city in 1859 and rechartered in 1897. The population in 1910 was 31,229; it had increased to 40,498 by 1916 (Federal estimate).

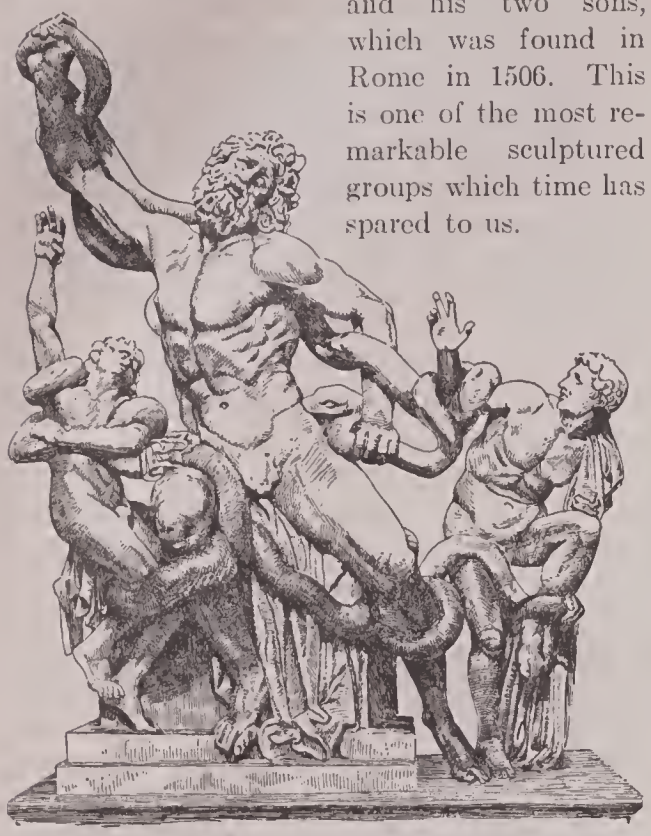
At Lansing the rivers are spanned by several bridges. In its course through the city the Grand River winds around the business section. In a park of ten acres stands the imposing state capitol, which was completed in 1879 at a cost of $1,500,000; its library contains 105,000 volumes. Other noteworthy buildings are the government building, Elks' Home, Masonic Temple, Union Depot and Y. M. C. A. quarters. Lansing has the state school for the blind, state industrial school for boys, state reform school and the state agricultural college. The latter, which is the oldest agricultural college in the United States, has connnected with it an agricultural experimental farm of 675 acres. A United States Weather Bureau station is also located here.

For recreation centers the city has Waverly Park and Pine Lake, both summer resorts, and seven other parks. Lansing is a trade center of importance in its territory. Ample water power for manufacture is supplied by the rivers, the Grand River having a fall here of about twenty feet. The largest industrial plants make automobiles, farm implements, engines, furniture, wagons and silk and woolen goods. The automobile industry is particularly important.

LANTERN FISH, a large group of deep-sea fish, whose distinguishing characteristic is the presence of light-giving organs along the sides of the body, which may be either in the head or near the tail. Living as they do in the depths of the ocean, it appears that they have been provided by nature with the light necessary for them. Many lantern fish are extraordinarily grotesque in appearance, with enormous heads and huge mouths armed with large teeth. A lantern fish about a foot long, which dwells along the Grand Banks of Newfoundland, is commonly known as the *viper fish,* because of its long, slender, snakelike body. One of the most curious of these oddly-formed fish is to be found only at great depths; it resembles a whale in shape and color, but is less than six inches in length.

LAOCOÖN, *la ok' o on,* in ancient classic legend, a priest of Neptune or Apollo, who warned his Trojan countrymen against bringing into the city the wooden horse by which Troy was captured (see Troy; Wooden Horse). The goddess Minerva, to whom the Greeks had consecrated the wooden monster, in revenge for his warning caused two snakes to come out of the sea. They first twined themselves around the two sons of Laocoön, and when he vainly endeavored to save them the serpents attacked

him and crushed him to death. Vergil's description of the death of Laocoön, given in the second book of the *Aeneid,* was probably inspired by the marble group of the Trojan priest and his two sons, which was found in Rome in 1506. This is one of the most remarkable sculptured groups which time has spared to us.



THE LAOCOÖN GROUP
In the Vatican, Rome.

LA PAZ, *lah pahz'*, a plateau city of 80,000 people in 1915, the legislative and executive capital of the republic of Bolivia. It is 12,120 feet above the sea level. It is 719 miles from Antofagasta, Chile, and 496 miles from Mollendo, Peru. Originally named in 1548 to commemorate the reconciliation between Pizarro and Almagro (for the name means *the peace*), it was rechristened La Paz de Ayucho in 1825 to commemorate the decisive battle for independence. The latter is its legal name to-day.

La Paz has been called the most cosmopolitan city of a mining country in all the world; people of all nations are there. Describing its approach, Charles M. Pepper says, "La Paz spreads along the inner sides of a rocky amphitheater, a panorama of red roofs, blended blue and white buildings, church towers and parks of willow and eucalyptus trees." The city has public squares and a boulevard, and the River La Paz winds through it.

Much unfriendly comment has been made upon its daily extremes of temperature, its narrow, ill-paved streets, its defective drainage, imperfect sanitation and its high death rate. La Paz is not the seat of either the supreme court or the archbishopric, both of which are at Sucre. However, popular interest attaches to its cathedral, dating from the seventeenth century, the University of San Andres, the national college, the national museum, a famous statue of Bolivar, the panoramic scenery of the approaches and the wireless communications established in 1915. The American Institute, begun in 1912, conducted by a faculty from the United States under patronage of the state government, is well attended. The university includes a modern commercial college. There is a lyceum for girls, founded in 1907.

LAPIDARY, *lap'i da ri,* from the Latin word *lapis,* meaning *stone,* is the name applied to one who cuts and polishes gems. Over sixty centuries ago lapidaries flourished in Assyria, Babylonia and Egypt, the earliest work in stonecutting being done with the *sapphire point.* About 3000 B. C. the *bow drill* was introduced, a device employed also by the American Indians. Previous to the fourteenth century gems were for the most part cut *en cabochon;* that is, polished smooth, with the original size and color of the stone retained as far as possible. The practice of cutting on the surface of the gem flat faces having a geometrical arrangement, or *facetting,* is of modern origin. Transparent gems, such as diamonds, are usually *faceted* because the reflection and refraction of light on their surfaces give them additional brilliancy. Opals, moonstones, turquoises and other opaque and translucent stones are cut *en cabochon.* Modern gemcutters use a lathe carrying a point or disk of soft iron, coated with diamond dust and oil. See Gems.

LAPIS LAZULI, *la'pis laz'u lic,* or **LAZURITE,** *laz'u rite,* a mineral whose beautiful azure-blue color makes it of value for ornamental purposes. It is composed chiefly of aluminum, sodium, silica and sulphur, and is found both in massive form and in crystals, in granite and in limestone. Some varieties show green, violet or red tints, and occasionally lapis lazuli is found which is flecked with brilliant spots suggesting the stars shining in the blue firmament. The Egyptians made use of this mineral in their jewelry, and the Romans called it *sapphire.* Modern nations have employed it in ornamental and mosaic work, and in the construction of altars and shrines. Formerly, it was the only source of the paint *ultramarine,* but it has been replaced for that purpose by an artificial product. The ancients,

who believed that it possessed medicinal value, ground it to powder and then mixed it with milk, forming a dressing for boils and ulcerations. The best specimens come from China, Siberia, Persia and Chile. See GEMS; ULTRAMARINE.

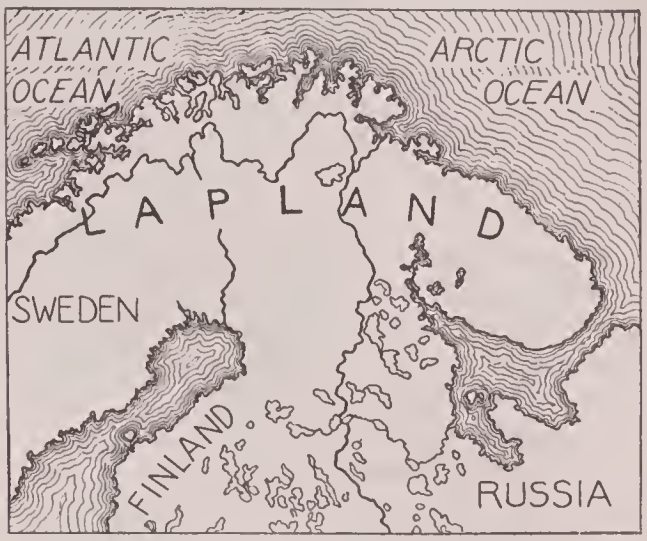
LAPLACE, *la plahs'*, PIERRE SIMON, Marquis de (1749-1827), the most famous of French astronomers, called "the Newton of France" and "the greatest mathematician of his age." To him the world is indebted for a series of brilliant discoveries in regard to the theory of planets, the question of tides and the problem of the stability of the solar system. Especially is his name connected with the world-famous theory of the origin of the solar system, known as the nebular hypothesis (which see), now largely discredited.

Laplace was the son of a poor farmer of Beaumont-en-Auge, and it was through generous friends that he was able to attend the College of Caen and the Military School at Beaumont. When only twenty years old he became professor of mathematics in the Military School of Paris, and from that time on he advanced steadily in fame and in position. Elected one of the "forty immortals" of the French Academy in 1816, Laplace before his death became a member of nearly every learned society in the world. His most celebrated work, the *Celestial Mechanics,* is a masterpiece of scientific writing. Of almost equal merit is his *Exposition of the System of the Worlds,* in which he set forth the nebular hypothesis.

LAP'LAND, a land of continuous cold, in Arctic Northwestern Europe, so called because it is the home of the people known as Lapps. It is a bleak land where the struggle for a livelihood is difficult; but the Lapps, though the smallest people of Europe, have great endurance and usually live in happiness and contentment.

Lapland really belongs to three countries—Norway, Sweden and Russia. On the north is the Arctic Ocean, on the east the White Sea, and on the west the Norwegian Sea. The southern boundary is indefinite, but Lapland's area of about 150,000 square miles consists of the Norwegian provinces of Nordland, Tromso and Finmarken; part of Sweden's province of Norrland and all of Norrbotten; Northern Finland and the Kola Peninsula, which belong to Russia.

The People and Their Mode of Living. In a land where there are nine months of extreme cold every year, where vegetation consists of little but mosses, lichens and sparse growths of birch, pine and fir, life must of necessity be difficult to maintain. In this land where in the extreme north there are two months of continuous daylight and two months of unbroken darkness, live a strange little people numbering about 25,000. They are small, averaging less than five feet in height, muscular, large-headed, with low foreheads, high cheek bones, flat features, and lips straight and thin. Their hair is black and straight, their faces yellow. Year in and year out they wear their garments of wool and reindeer skins, never removing them until they need new ones, seldom washing even their faces. They are dirty, yet healthy; uneducated, but, perhaps because of their ignorance, contented and merry-hearted. They can, however, be cruel and selfish, for many of them have a great love of money and drink.



LOCATION MAP

There are three groups of Lapps. The *Mountain Lapps* live a wandering life, moving from place to place with their herds of reindeer, pitching their tents wherever herbage is plentiful, and, as described in the lines by James Thomson—

> The reindeer form their riches; these their tents,
> Their robes, their beds, and all their homely wealth supply.

The children of the Mountain Lapps, who know nothing of the happy, care-free life of boys and girls in lands to the south of them, seem like little old men and women, for they must early do their share in the work of the household. In one cone-shaped tent the entire family, including dogs, live, eat and sleep. These simple people pass an uneventful existence, content to rove from place to place,

living chiefly on reindeer-meat, cheese and reindeer-milk and drinking melted snow, and cheerfully fighting the elements of snow, rain and winds.

The *Sea Lapps* are more numerous than the Mountain Lapps. They live along the coast in rude huts of wood and sods, and their principal occupation is fishing. Their life is more even, and a number of families build their homes close together to form little settlements. The *River Lapps* are perhaps the most progressive. They live in settlements on river banks, and fish, hunt, keep reindeer, cows and sheep and do a little farming.

The language of the Lapps is similar to Finnish. Most of the people profess Christianity, and they travel many miles in their reindeer-sledges to attend the churches.

Economic Resources. The most valuable resource of the entire Lapland region consists of the beds of iron ore in Southern Swedish Lapland, which are among the best and most extensive in the world. Mines are being worked at Gellivare and Kirunavaara. A 280-mile railroad has been built from Lulea, a port on the Gulf of Bothnia, to Gellivare, forty-four miles north of the Arctic Circle, and across Lapland to Victoria Haven, to reach an ice-free port for the export of ore to England and Germany. Over 4,000 tons are produced annually. M.S.

Consult Walter's *Norse and Lapp;* Fulton's *With Ski in Norway and Lapland.*

LA PLATA, *lah plah'ta,* the capital of the Argentine province of Buenos Ayres, South America. It was founded in 1882, after the city of Buenos Ayres, from which it is about thirty-two miles southeast, had been made the federal capital. The city has enjoyed rapid growth, and enterprise is apparent everywhere in its well-paved streets lined with modern shops, its many fine open squares, and its numerous public buildings. The capitol and other buildings of the provincial government, the observatory and the fine new railway station are especially noteworthy. The harbor at La Plata is joined by a canal to a larger outer harbor at Ensenada, on the estuary of the River La Plata. The manufacture of cotton and woolen tissues is extensively carried on. Population, 1912, 106,380.

LA PLATA, Rio de. See Plata, Rio de la.

LA PORTE, *lah port',* Ind., an industrial city which enjoys popularity as a summer resort, situated in the northwestern part of the state twelve miles from Lake Michigan. It is the trade center of La Porte County, of which it is the county seat. Michigan City is twelve miles northwest, South Bend is twenty-eight miles east and Chicago is sixty miles northwest. The city has railway accommodations through the New York Central, the Lake Erie & Western and the Pere Marquette railroads, and interurban electric lines connect with Elkhart, South Bend, Michigan City and Chicago. The first settlement was made in 1830; it was incorporated as a town in 1835 and as a city in 1852. Germans, Poles, Greeks and Jews form a large part of the population, which increased from 10,525 in 1910 to 13,202 in 1916 (Federal estimate). The area of the city is a little more than three square miles.

La Porte is like a natural park set close to a chain of lakes, and near-by boating and fishing facilities have made it an attractive summer resort. In the winter these lakes furnish large supplies of ice, most of which is shipped to Chicago. Fox Memorial and Bluffside are attractive parks within the city. La Porte has extensive industrial establishments, the most important being sawmills and braiding mills, foundries, machine shops, breweries and cooperages; there are also manufactories of furniture, woolen goods, pianos, threshing machines, flour and brooms. Among the notable buildings are the Federal building, a fine courthouse, a city hall, the Association House for women and girls and the Ruth Sabin Home. Besides its public schools, the city has Saint Rose's Academy, a business college and a public library.

LAPRAIRIE, *la pra'ree,* the county town of Laprairie County, Quebec, on the south shore of the Saint Lawrence River, near the Lachine Rapids and six miles south of Montreal. It is on the Grand Trunk Railway and has ferry service to Montreal. It is a popular summer resort, but is also important for its saw and carding mills, tannery, creameries and canneries. The first railway in Canada was built in 1836 from Laprairie to Saint Jean (Saint John). Population in 1911, 2,388; in 1916, about 3,000.

LAP'WING, a crested plover, one of the commonest and best-known birds of Western Europe, especially in the British Isles, where it is resident the entire year. It is partly bronze green in color, with the throat and breast blue-black and the sides of the head and neck and the underparts white. When on the ground it has a handsome and graceful appearance, but in flight it has an awkward, flapping movement, which gives it its name. It is also called the *peewit,* from its shrill, wailing cry. The

lapwing has the habit of pretending to be lame or hurt when its nest or young are approached, by this ruse luring the intruder off to a safe distance. Its nest is a depression in the soil and contains four olive-green eggs, thickly spotted with black and brown. The eggs are considered a great delicacy, and are gathered and sold in city markets.

THE LAPWING

Lapwings are only accidental in North America. In South America is found a species known as the *Cayenne lapwing,* groups of which have been observed going through a singular marching movement, like a children's game. Another interesting lapwing is the *crocodile bird* of Egypt, which, from the time of Herodotus, has been known as the companion of the crocodile, removing for food the bugs, leeches, etc., that find lodging on the monster's skin and, in turn, warning it of approaching danger. In this characteristic it is much like the rhinoceros bird (see RHINOCEROS). Lapwings are also found in Arabia, Persia, India and Ceylon.

LARAMIE, *lair'a mi,* WYO., the county seat of Albany County, is situated in the southeastern part of the state, on the great Laramie Plains, partially surrounded by the Medicine Bow Mountains on the west and the Laramie Range on the east. The elevation is 7,165 feet. Cheyenne is fifty-seven miles southeast and Denver is 132 miles south and east. Laramie is on the Big Laramie River and on the Union Pacific and the Colorado, Wyoming & Eastern railroads. The Laramie, Hahn's Peak & Pacific Railway is a local line running westward to the hunting and fishing resort of the Medicine Bow Mountains and North Park. The area of the city is nearly two square miles. In 1910 the population was 8,237; it was 8,257 in 1916 (Federal estimate).

Here is located the University of Wyoming, with its several colleges, including the state normal school, the school of mines and engineering and the agricultural college; the United States experiment station and a fish hatchery are government enterprises. Among the more prominent buildings are a Federal building, erected in 1906 at a cost of $120,000; a Carnegie Library and a Masonic Temple. Laramie is the see of the Episcopal Church in Wyoming.

This city is the supply and trading center of a large stock-raising and mining region. Extensive irrigation projects are rapidly developing agriculture; already alfalfa, grains and potatoes are successful crops. In the vicinity are found extensive deposits of soda, lime, sand, coal, oil and natural gas; there is also considerable gold and silver, lead, copper, iron and graphite. Three large cement and plaster mills are supplied from huge plaster deposits near the city. Other industrials include stock yards, railway and machine shops and an ice plant.

A settlement made here in 1868 was named in honor of Jacques La Ramie, a French trapper. It was chartered as a city by the legislature of Dakota in 1868, and rechartered by the legislature of Wyoming in 1873.

LARCENY, a form of theft, consists in dishonestly taking away the personal goods of another. Its exact definition varies according to local statutes. In some states and provinces larceny is divided into two classes, *grand* and *petit.* In grand larceny two degrees are sometimes distinguished, usually as follows: the *first,* larceny in the night, or larceny of property worth more than five hundred dollars; the *second,* larceny of property worth more than twenty-five dollars and less than five hundred dollars. *Petit larceny* includes taking of property of less than twenty-five dollars in value. *Grand larceny* is usually punished by imprisonment, *petit larceny* by fine or imprisonment. Until 1827 some forms of larceny in Great Britain were punishable by death. Larceny is usually distinguished from ROBBERY; BURGLARY; EMBEZZLEMENT; see the articles under those heads. R.E.B.

LARCH, the name of a group of trees belonging to the cone-bearing family (coniferae). There are three North American species: the *tamarack,* sometimes called *hackmatack,* the *Western larch* and the *Alpine larch.* They are slender, conical trees, varying from fifty to 250 feet in height, with branches which in old trees droop toward the ground. The bark, which is used in tanning and dyeing, is thin and scaly. Leaves or needles are clustered in little sheaths on short spurs. Flowers of two sorts come from some of the buds, while others produce crowded tufts of needles. The tough roots of the larch were used by the Indians to bind up their canoes, as Longfellow tells us in *Hiawatha:*

Give me of your roots, O Tamarack!
Of your fibrous roots, O Larch-Tree!
My canoe to bind together.

Larch wood, which contains a great deal of resin but does not burn readily, is tough and durable, and timbers of it in old French castles have been found perfectly sound when stones

THE LARCH
Tree and detail of branch.

of the building were crumbled and decayed. It is widely used for telegraph poles, ship masts, railroad ties and fence posts, and yields a large percentage of excellent lumber which is, however, difficult to dry.

Of a total amount of nearly 410,000,000 feet of larch lumber cut in the United States annually, the contributions of various states are practically as follows, the figures representing per cent:

Montana	30	Washington	7
Idaho	28	Michigan	7
Minnesota	17	Oregon	3
Wisconsin	8		

About 100,000,000 board feet of tamarack are produced each year in Canada. The most important commercial use of the wood in that country is for making railroad ties.

LAR'COM, Lucy (1826-1893), an American poetess, was born at Beverly, Mass. After three years in school she became a factory employee in the cotton mills at Lowell. Her contributions to the *Lowell Offering,* a periodical for the mill employees, attracted the attention of John Greenleaf Whittier, with whose assistance she afterwards compiled *Child-Life* and *Songs of Three Centuries.* For three years she attended the Monticello Female Seminary in Illinois, then returned to Massachusetts and taught in the Norton and Boston schools. In 1865 she became assistant editor, and in 1866 editor, of *Our Young Folks,* a magazine since absorbed by *Saint Nicholas.* Her writings include *Similitudes, Ships in the Mist* and *Wild Roses of Cape Ann.*

LARD, or hog fat, is a substance used extensively for cooking, for soap making, as a lubricant and in the preparation of ointments. It is extracted from the fatty parts of the hog by melting in kettles. When brought to a high temperature it is strained, then cooled by refrigeration and clarified. Lard intended for culinary purposes—for making of biscuits, pie crust and other pastry, and for frying foods of various kinds—is run into pails just before it solidifies. The finest lard, called *leaf lard,* obtained from the fat around the kidneys of the hog, is used both in cooking and in the preparation of oils and ointments. When the fat is subjected to pressure a substance known as *olein* is liberated in the form of lard oil, which is used extensively for lubricating machinery.

On the farm the hog fat is cut into small pieces, put into kettles over bonfires and heated until the grease is entirely dissolved from the tissues, or "cracklin," when it is run into vessels to cool. The fat around the kidneys, which is removed from the hog in large, irregularly-shaped pieces, is often bought by the housewife who prefers to render it into lard herself, so she may be sure that the cooking fat is not adulterated. She wastes very little in buying leaf lard, as the tissues, which are left after the lard is extracted, weigh very little.

Lard is composed of *olein, stearin* and *palmitin,* in the proportion of sixty-two per cent of olein to thirty-eight per cent of the other ingredients. As a food it is wholesome, and when fresh is mild in flavor and pleasing in odor.

LAREDO, *la ra'doh,* Tex., the county seat of Webb County, situated on the Rio Grande River, the International boundary line, opposite Nuevo Laredo, Mexico. It is about 125 miles from the Gulf of Mexico and 150 miles southwest of San Antonio, and is on the International & Great Northern, the National of Mexico and the Rio Grande & Eagle Pass railroads. The population, which in 1910 was 14,855, was 15,749 in 1916 (Federal estimate). Interesting features of the city are the Federal building, courthouse and jail, city hall, the market, Mexican National Hospital and Mercy Hospital and an old Spanish cathedral. There is a railroad bridge across the Rio Grande. Loma Vista Park is an attractive pleasure re-

sort of sixty-five acres, and immediately west of the city is a United States military post, Fort McIntosh. The chief institutions are the Laredo Seminary (Methodist Episcopal) and Ursuline Academy and Convent.

Laredo is the commercial center of a productive agricultural section, irrigated from the Rio Grande, and is in an extensive stock-raising country. Mineral deposits, especially coal and iron, are a part of the wealth of the community. The annual international trade in imports is sometimes more than $2,500,000, and exports often reach $14,000,000. The chief crop is Bermuda onions; live stock and wool, brick and coal are also exported. The industrial plants of the city include foundries, car and machine shops, sheet-metal works, broom and mattress factories, concentrating and sampling works, stockyards and a hide establishment.

A mission for the native Indians was established at Laredo a number of years before the first permanent settlement, which was made by the Spaniards in 1767. It was incorporated about 1848.

LARES AND PENATES, *la'reez, pe na'teez,* in ancient Roman mythology, the deities who were supposed to watch over the destinies of the family and state, and who were usually represented by small images in the hearth or in a special shrine. These images were the most cherished possessions of a household, and a place was always provided for them in a new home before the comfort of the family was considered. The Lares were supposed to be the spirits of deceased mortals who returned to watch over their families and friends, whose homes they guarded from exterior dangers; the Penates had always existed as deities, and protected the interior of the home. Originally the divinities were separate and distinct, but later were connected to denote the worship of ancestors and the hearth. In modern times the terms are commonly used to designate one's home or household possessions.

LARK, a family of birds found in Europe, Asia, Africa and America, noted for sweet singing and remarkable powers of flight. About 100 species have been identified, best known of which are the *skylark,* which nests throughout Europe and the temperate parts of Asia, and the *horned lark,* the only member of the family native to America. The *titlark* and *meadow lark* are not true larks, but belong to entirely different families. See MEADOW LARK.

The skylark, whose song may be heard when the singer itself is lost in the depths of the sky, is the theme of one of Shelley's most exquisite poems. Hardly more joyous is the singing of the skylark than the poet's melodious lines:

Hail to thee, blithe spirit!
Bird thou never wert—
That from heaven or near it
Pourest thy full heart
In profuse strains of unpremeditated art.

Higher still and higher
From the earth thou springest,
Like a cloud of fire;
The blue deep thou wingest,
And singing still dost soar, and soaring ever singest.

This bird was also the inspiration of a beautiful painting by the French artist Jules Breton—*The Song of the Lark.* It now occupies an honored place in the Art Institute of Chicago; a faithful reproduction in color appears in these volumes, opposite page 916.

This sweet songster is a modest little bird, about seven inches long, clothed in a yellowish-brown coat streaked with dark brown. It is dull white on the underparts. It has the peculiar foot structure characteristic of the lark family, the hind toe being provided with a long, straight claw. It usually nests in the open field, laying four or five dull-gray eggs, marked with olive-brown, and it raises two broods a season. The skylark has been naturalized in Long Island.

The horned larks are found in the northern parts of both the Eastern and Western hemispheres. They breed throughout Canada and the United States, except in the South Atlantic and Gulf states, and in winter may be seen in every state of the Union except Florida. These birds are about seven and one-half inches long. Their plumage is dull chocolate-brown above, and their distinguishing marks are a black patch on the breast and small hornlike tufts of dark feathers above and behind the eyes. In the breeding season the males soar high in the air, like the skylark, pouring forth their melodious song while on the wing. They feed on weed seeds, waste grain and various insect pests, including the May beetle, cloverleaf weevil, potato-stalk borer, nut weevil and chinch bug, and are therefore valued aids to the farmer. Grasshoppers and cutworms are also a favorite food. E.T.S.

LARK'SPUR, a summer-flowering herb of the buttercup family, which is found in the cool regions of both hemispheres. It receives its name from the odd formation of the flower parts, the upper sepal having a long, curved

spur, and the other five being grown together. The petals, too, are irregular in form. About 100 species have been described, many of which have been cultivated as ornamental plants. The flowers are blue, white or pink. One species grows in great profusion in California. Some species are considered poisonous, cattle and horses being most susceptible, and many cases of larkspur poison have been reported from the Western ranges. Sheep are practically immune. A species cultivated in Europe, containing several alkaloids, is used for medicinal purposes.

LARKSPUR

LARKSVILLE, Pa., a borough in Luzerne County, in the northwestern section of the state, situated three miles northwest of Wilkes-Barre and on the Susquehanna River. It is located in the heart of a rich anthracite-coal field and in the midst of beautiful mountain scenery. Larksville is distinctly a mining town, having almost no industrial interests beyond coal mining. An interurban railway is in operation between this point and adjacent cities and towns. In 1910 the population was 9,288. The area of the borough is nearly five square miles.

LARVA, *lahr'va.* In the life history of many small creatures, the first form of life which appears from the egg is vastly different from the parent. In that early stage it is called a larva, which is a Latin word meaning *ghost, specter* or *mask.* The plural form of the word is *larvae.* The term is used in the sense that the creature in that stage hides, or masks, the real character of the finally perfect individual. It was first applied to insects only, but now also covers the early form of any animal in which there is little resemblance to the parent. For example, the *tadpole* is the larva of the frog. The larva of a moth or a butterfly is called a *caterpillar;* that of a fly is called a *maggot;* that of a beetle is known as a *grub.*

LARVAE

(*a*) Butterfly; (*b*) beetle; (*c*) mosquito; (*d*) frog.

The principal duty of a larva is to eat and grow, and in so doing considerable harm is done to vegetation by certain species. At different points in their development larvae outgrow their skins and shed them. Finally some enter what is known as the *pupa,* or the *chrysalis,* stage, from which they at last emerge in their true forms.

Related Subjects. The reader is referred to the following articles in these volumes:

Butterfly	Frog
Caterpillar	Insect
Chrysalis	Metamorphosis

LARYNGITIS, *lar in ji' tis.* This term, like all medical terms ending in *itis,* signifies an *inflammation*—in this case, of the voice box, or larynx. Laryngitis is always accompanied by by more or less hoarseness and cough, the latter caused by tickling or irritation. The hoarseness may continue for a short time only, as in public speakers who use the voice much, and often incorrectly, or it may be persistent or chronic hoarseness, which exists in consumption and syphilis of the larynx. Between these two are all grades of severity, and the causes are many and varied.

The healthy throat may be overworked and ready to become inflamed by a cold; the voice may be overtaxed, as in public speaking; the throat may be irritated by alcoholic beverages, tobacco, condiments, like pepper and vinegar, inhalation of dust, gas or vapor, as a necessary accompaniment of one's occupation. As a result of these conditions ulcerations are formed on the throat.

Whenever a condition of hoarseness persists over a week, the victim should at once consult a reliable physician. S.C.B.

LARYNX, *lar'ingks,* an organ of the body, boxlike in shape and composed of nine sections of cartilage. By it the voice is produced. It lies above the windpipe, between that tube and the hyoid bone. Of the cartilages which compose the larynx the most important are the *thyroid* and the *cricoid.* The former consists

of two winglike plates of cartilage which constitute the side walls of the larynx and meet in front to form the projection popularly known as Adam's apple. The cricoid cartilage is shaped like a signet ring, its broad side forming the back wall of the larynx. The voice is produced by means of the *true vocal cords,* two bands of elastic tissue controlled by small muscles and stretching between the upper front edges of the cricoid cartilage and the inner front wall of the thyroid. Between the true vocal cords is an opening known as the *glottis,* and above and lying parallel with them are other folds of membrane, the *false vocal cords,* so called because they have no share in voice production.

The sounds produced in talking or singing are the result of the vibration of the true vocal cords, this vibration being caused by the air rushing through the voice box. High, shrill notes are produced when the cords are tightly stretched, while deep, rumbling tones indicate a slackening of the elastic bands. An adult male has longer cords than an adult female, and this is true also of the glottis. The larynx of a boy who is approaching maturity undergoes rapid growth, a process which gives him a "cracking" voice. See VOICE J.H.K.

LA SALLE, *la sal',* RENÉ ROBERT CAVELIER, Sieur de (1643-1687), next to Samuel Champlain, was the greatest of the French pioneers in America. He was born at Rouen, France, emigrated to Canada at the age of twenty-three and settled upon a tract of land eight miles above Montreal. In 1669 he sold his land and started on a tour of Western exploration in company with a party of missionaries bound for the upper Great Lakes. He soon left the party, however, and with a few followers proceeded southward. He is reported to have discovered the Ohio River and to have descended it as far as the rapids at Louisville, but his biographers are not agreed upon this point. Within the next two or three years La Salle traveled the length of Lake Michigan, crossed to its western shore and explored the valley of the Illinois River.

LA SALLE

In 1673, on recommendation of Count Frontenac, governor of Canada, he obtained from the French court a title of nobility and the grant of a large tract of land which included Fort Frontenac, on the site of the present city of Kingston, Ontario. Had La Salle remained there and engaged in the fur trade he might have become wealthy, but he was moved by a larger purpose. The rich country of the Illinois appealed to him, and he saw in it the site of a future empire, which in time might exceed the home country in wealth. It was his ambition to acquire and develop this vast territory for France. Accordingly, in 1677, he went to Paris and laid his plans before the court. He was received with honor, and many of his requests were granted, with the provision, however, that his plans be carried out without expense to the government.

La Salle's enterprise aroused the opposition and jealousy of the Canadian fur traders, because, should it succeed, it would deprive them of a part of their revenue. Notwithstanding this opposition, however, he proceeded to carry out his plans. He returned to Canada in 1678, and the following winter built, near Niagara, the *Griffin,* the first sailing vessel placed upon the Great Lakes. In the summer of 1679 the *Griffin* sailed to the Strait of Mackinaw, but it was lost on the return voyage.

During the next three years La Salle descended the Mississippi to its mouth, and there took possession of the entire Mississippi Valley for France, naming the region Louisiana, in honor of his king, Louis XIV. Much of what formed the Louisiana Purchase in 1803 was included in this region. In 1680 he built Fort Crevecoeur, on the Illinois River, above the present site of Peoria. This was the first rude settlement by white men within the present state of Illinois. Two years later Fort Saint Louis was built upon a bluff of the Illinois River, near the present village of Utica. Around this fort La Salle gathered and maintained for twenty years the largest confederation of Indian tribes ever controlled by a white man for so long a period. The bluff upon which the fort was built is now known as *Starved Rock* (which see), and is in the center of a state park.

Having established his fort and placed it in charge of his lieutenant, Tonty, La Salle again went to France to secure means and people for establishing a colony at the mouth of the Mississippi. In 1684 he sailed for the Gulf of Mexico. The expedition was embarked on four

vessels, and included a hundred soldiers, besides carpenters and colonists, with a good store of supplies. However, when the ships reached their destination, La Salle mistook Matagorda Bay for the mouth of the Mississippi, and the colonists were landed at that point. There was dissension between La Salle and the captain of the fleet, and the latter departed before the mistake was discovered. La Salle saw that his colony was doomed unless assistance could be procured, and with a few followers he heroically set out on foot for Canada, to obtain the necessary relief. On the way he was treacherously shot from ambush by one of his followers.

La Salle was a man of great vision and untiring energy, but he lacked the tact necessary to enable him to hold his followers loyal to his cause. During his entire career he faced opposition and obstacles which would have overwhelmed one of less energy. "It is easy," says Parkman, "to reckon up his defects, but it is not easy to hide from sight the Roman virtues that redeemed them. America owes him an enduring memory; for, in his masculine figure, she sees the pioneer who guided her to the possession of her richest heritage." His name is perpetuated in a county of Northern Illinois, and in a thriving city of that county, situated on the Illinois River, ninety-nine miles southwest of Chicago. M.R.T.

Consult Abbott's *The Adventures of the Chevalier de La Salle and His Companions;* Thwaites' *France in America.*

LA SALLE, Ill., an important industrial city of Northern Illinois, with extensive coal-mining interests, situated in La Salle County about midway between the geographical center of the state and its northern border. It lies at the head of navigation of the Illinois River, and at the western terminus of the Illinois and Michigan Canal. Ottawa is fourteen miles east, Peoria is sixty-two miles southwest and Chicago is ninety-nine miles northeast. Railroad transportation is provided by the Chicago, Rock Island & Pacific, the Illinois Central and the Chicago, Burlington & Quincy; interurban electric railways connect with Chicago and intervening cities. La Salle was settled in 1830, was incorporated as a city in 1852 and named for René Robert Cavelier La Salle, the French explorer. Poles predominate in the large foreign element. The population increased from 11,536 in 1910 to 12,221 in 1916 (Federal estimate). The area of the city is three square miles.

The country surrounding La Salle is a rich bituminous coal region, and the city is the center of a large trade carried on by means of rail, river and canal. Coal mining is an important industry, but there are extensive manufactures of spelter, sheet zinc and sulphuric acid. One of the establishments employs 2,000 men, its annual output being nearly $7,000,000. Some of the largest Portland cement mills in the state are located here, and there are manufactories of clocks, brick, sheet-metal tools, machinery, plows and acid phosphate. Silica sand, fire clay and cement rock are found in the vicinity.

The notable buildings are a $100,000 Federal building, erected in 1916, a $200,000 hotel, built in 1915, and the township high school. In addition to the public and parochial schools the city has a business college and a Carnegie Library. Features of interest are a state mine-rescue station, the Illinois Central Railroad bridge and Hegeler Park. In the vicinity are Deer Park and Starved Rock. On the latter a band of besieged Indians died of starvation about 1774 (see Starved Rock). R.W.T.

LASSALLE, *la sal',* Ferdinand (1825-1864), a disciple of Karl Marx and the founder of the German Social Democrat party. As a political movement Socialism owes more to him than to any other man. He was born at Breslau, and studied at the universities of Breslau and Berlin. By 1848 he had become a radical Socialist, but although he wrote several pamphlets, he was never so influential through his writing as through his leadership. He first showed his ability as an organizer at the time of the democratic disturbances of 1848, and for his activity in that revolt he was imprisoned. From that time until 1861 he confined his activities chiefly to writing on philosophy and Socialism. In 1861 he organized the working classes into the first German labor union, and was again imprisoned for sedition. In the summer of the same year he was killed in a duel. See Marx, Karl.

LAS VEGAS, *lahs va'gas,* N. M., an important wool market of the Southwest, located in the northeastern part of the state, 132 miles northeast of Albuquerque and forty-eight miles east of Santa Fé. It is generally regarded as one city, but there are really two separate corporations. The older community, largely a Mexican town, is on the west bank of the Gallinas River. It is the county seat of San Miguel County, and contains the county courthouse. The modern city, known officially as

East Las Vegas, is on the east side of the river, and is served by the Atchison, Topeka & Santa Fe Railroad. It is the seat of the New Mexico Normal University and of the New Mexico Insane Asylum, and contains a Carnegie Library and various sanatoriums. The combined population of the town and city in 1910 was 6,934.

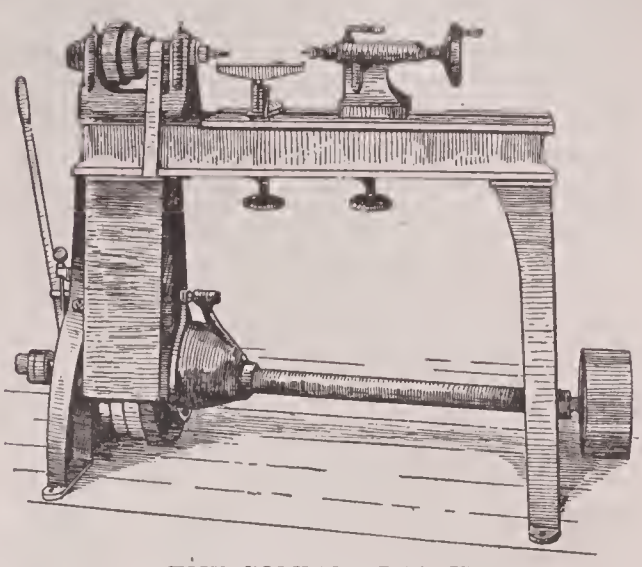
Las Vegas is situated on a great plain about 6,400 feet above sea level and has an extremely healthful climate. In the hills six miles northwest of the city is Las Vegas Hot Springs, a community and sanatorium in the vicinity of about forty hot springs, whose waters vary from 70° to 140° in temperature. Agriculture and stock raising are the chief interests of this section. It has railroad machine shops, a foundry and machine shop, wool-cleaning mills, carriage and wagon shops, flour mills and planing mills.

The old town of Las Vegas was settled under the Mexican Republic in 1835, and was incorporated in 1903. East Las Vegas was incorporated in 1888 and chartered as a city in 1896.

LAT'ERAN, the cathedral church of the Pope of Rome, which ranks higher in dignity than any other Roman Catholic church in the world. It is erected on the site of the palace of Plautius Lateranus, which was confiscated by the Emperor Nero and later came into possession of Constantine the Great. He presented it to the Catholic Church in 312, and the first church structure was built on the grounds twelve years later, by Pope Sylvester I. This was destroyed by an earthquake in 894, and the second and third churches were burned. Urban V made the fourth restoration in 1362, and the edifice has since then undergone several modifications.

In this church the entrance of the Pope into office is celebrated with solemn effect. Five general councils, known as the famous Lateran councils, have been held here. The present Lateran palace, which was built about 1580, was the residence of the Popes until Avignon, France, was made the temporary seat of the Papal court, but since the return to Rome they have lived in the Vatican. The palace contains two important museums, which, together with the church, were presented to the Papacy in 1871 by the Italian government. Pope Leo XIII and many of his predecessors are buried in the Lateran.

LATHE, *layth,* a machine for working wood or other substances by rotating them before a tool held at rest. They are used for cutting, polishing, filing, engraving and other like operations. The essential parts are the frame, or bed; the poppets, which support the object, and the rest for the tool. The space between the poppets can be adjusted to objects of varying lengths, and the left-hand poppet, con-



THE COMMON LATHE

nected with the source of power, forms the rotating head-stock. The tool rest is clamped to the bed between the two poppets. In the case of hand-operated machines, the tool is held in position by the turner; the larger machines are now driven by steam or electricity. Lathes for turning wood are operated at greater speed than those used for brass or iron.

LA'THROP, JULIA CLIFFORD (1858-), an American social worker who became nationally prominent in 1912, when President Taft appointed her chief of the Children's Bureau, a division of the Department of Labor. This was the first time that a woman had been placed in charge of a Federal bureau. Miss Lathrop was born in Rockford, Ill.; she studied at Rockford College, and in 1880 was graduated from Vassar College, of which she is one of the trustees. For many years after 1889 she was associated with Miss Jane Addams at Hull House, Chicago, where she gave much of her time to encouraging coöperation between citizens and official agencies for the re-

JULIA LATHROP
Head of the Children's Bureau of the United States.

lief of harmful social conditions. See HULL HOUSE.

She began her public work as a volunteer county visitor, under appointment of the Cook County agent to investigate needy cases in the neighborhood of Hull House. In 1893 she was appointed a member of the Illinois State Board of Charities, but resigned in 1901 as a protest against the prevailing political control of state institutions. She was, however, reappointed in 1905, and served until 1909. Miss Lathrop was largely instrumental in the establishment of the Illinois Society for Mental Hygiene, an organization of which she was the first president, and she has shown great interest in the improvement of hospital conditions for the insane. She visited Europe and investigated the methods used there for the care of the insane and of children; she assisted in establishing the Chicago Juvenile Court and the Chicago School of Civics and Philanthropy.

The Federal Children's Bureau, of which she has been head since 1912, has for its duty the investigation of matters affecting the welfare of all children. See CHILDREN'S BUREAU.

LAT'IMER, HUGH (1490-1555), an English reformer and martyr, one of the divines appointed by the University of Cambridge to investigate the legality of Henry VIII's marriage with Catharine of Aragon (which see). By declaring for the king he secured the favor of Henry VIII, who appointed him one of his chaplains. He became bishop of Worcester in 1535, and at the opening of Convocation preached two powerful sermons urging the necessity of reform in the Church. Not being willing to accept the Six Articles, which he thought favored Roman Catholicism, he resigned his bishopric in 1539, and lived in great privacy for six years. At the end of that period he was confined in the Tower.

On the accession of Edward VI Latimer was released, but when Mary came to the throne he and other reformers were arrested and imprisoned. He was confined in jail for more than a year, feeble, sick and worn out by long-endured hardships, but his enemies would not wait for him to die. Summoned, with Ridley, before certain commissioners who were appointed to judge the two reformers, he was condemned to be burned at the stake. When brought to the place of execution opposite Balliol College, on the 16th of October, 1555, he exclaimed to his companion, "Be of good comfort, Master Ridley, and play the man; we shall this day light such a candle, by God's grace, in England, as I trust shall never be put out." See RIDLEY, NICHOLAS.

LATIN LANGUAGE, a language which belonged originally to the central Italian tribe of the Latins, but which became with the spread of Roman influence the dominant tongue of the ancient world. It belongs to the Indo-European family (see ARYAN), and was one of a group of related languages spoken in ancient Italy. When scholars first began to give attention to problems presented by philology, they assumed a close connection between Latin and Greek—closer than between other members of the Indo-European family; and in consequence argued that there must have been a single race from which both Greeks and Italians were descended. Closer study in recent years has shown, however, that no such close relationship exists, and that Latin is nearer to the Celtic than to any other tongue (see CELTS).

The Three Periods of Latin. The history of Latin as a living language divides itself into three periods: the *preliterary,* which extended from the earliest times to the beginning of Latin literature, about 240 B.C.; the *literary* period, from 240 B.C. to about A.D. 170, and the period of *decay.* In its earliest period, which is represented by inscriptions and a few manuscripts, Latin was a crude, undeveloped language, incapable of expressing the thoughts of a people in a high state of civilization. During the third and second centuries B.C. the change from a mere rustic dialect to a literary language took place, the poet Ennius having a great part in its development; and the so-called Golden Age (80 B.C.-A.D. 17) saw Latin brought to its highest point of perfection. Cicero and Caesar in prose, Vergil and Horace in poetry, showed what majestic effects might be achieved with this comparatively new medium. Throughout the later literary period, in the hands of writers whose chief striving was after ornament and overelaboration, Latin lost the simplicity which had been its chief charm in the works of the great authors mentioned above. Its vigor departed, and the decline was steady, until by the third century A.D. literary Latin could scarcely take rank as a living language.

From It Sprang Other Languages. Latin differed from most other languages in that it had no dialects, in the ordinary sense of the term. There was, however, developing side by side with literary Latin, a vernacular, or localized Latin, which differed in many respects

from the more formal speech. The distinction grew wider through the centuries, as the classical Latin declined and the speech of the common people became more vigorous, and by the fifth century the *Lingua Romana,* or language of Rome, as it was called, had entirely displaced the pure Latin. It was from this speech of the people that the Romance languages of Europe were derived—French, Italian, Spanish, Portuguese, Rumanian, etc. The Latin which was used throughout the Middle Ages in the schools and monasteries of Europe, as well as in official documents, was a deteriorated form of the early literary Latin. Modern English has many words which are derived directly from the Latin or indirectly, through the French or Italian. Modern scientific names, for instance, are almost all of Latin origin. A few examples of such derived words are given in the article philology.

Alphabet and Pronunciation. The Latin alphabet was derived from the Greek, which was brought to Italy by Greek colonists who settled in the southern part of the peninsula. In classical times the alphabet had twenty-three letters, the *j, u* and *w* of the English alphabet not being present. The letters did not in all cases have the same phonetic value as the Greek, and in some instances they differed in sound from their English derivatives. The "Roman method" of pronunciation which is used almost exclusively to-day in the schools is an attempt to approximate the original pronunciation of Latin, and differs from the "English method," which pronounces Latin words just as though they were English.

Like the Greek, Latin was an inflected language (see INFLECTION), though it was far from having as many verb forms as had Greek, especially in its early stages. In certain qualities, however, it ranked high, notably in concreteness and in precision of expression. The Romans, compared with the Greeks, were an unimaginative people, and it is natural that their language should have been better adapted to prose than to poetry, but in the hands of such a master as Vergil it was shown to be capable of a dignity and a sonorousness which have rarely, if ever, been equaled.

As a Study in Schools. Since the Renaissance there has never been a time when Latin has not been studied in the schools, and throughout the medieval and much of the modern period it was the chief study. A young man in his early college years was expected not only to translate fluently the great masters (that was really preparatory school work), but to write original Latin essays and poems. Of late years much opposition has grown up to the required study of this "dead language," and in many schools and colleges, especially in the United States, comparatively little stress is now laid on Latin. By time-honored rule, no college student in the past could earn his A. B. degree without Latin as a considerable part of his prescribed course of study. Since the introduction of the elective system, however, this requirement has been generally abandoned in the United States, although in most English and other foreign universities it is still maintained.

As the study of Latin is now arranged in most schools, the grammar of Latin is studied during the first of the time devoted to this language; Caesar, either four or eight books of the *Gallic Wars,* occupies the second year; Cicero's *Orations* the third year, and the poetry of Vergil the fourth year. The above covers the full high school course, with exercises in Latin composition, etc. College Latin includes a study of Livy, Horace, Terence, Plautus, Catullus, Tibullus and other writers.

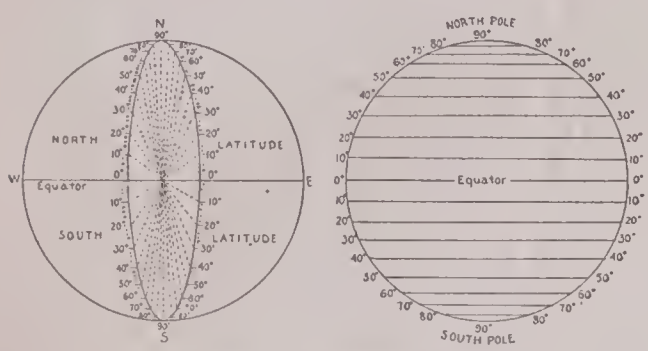
Two facts remain indisputable, however: first, that no language can ever be dead while it has a living literature of such worth as the Latin classical writings; second, that Latin, by reason of its orderliness and precision, affords in its study a mental discipline some developing minds might never acquire in any other way. The person who does not know Latin need not be deprived of the knowledge which the language offers in history and literature, for superior translations of every old Latin author are offered. What of charm is lost to the reader of translations that person never knows; he gets the facts, and in this practical day that seems to satisfy. A.MC C.

Excellent Latin textbooks, better than past generations possessed, may be had from many schoolbook publishers. Any good bookstore can furnish literal translations of CAESAR, CICERO, VERGIL and others.

LATIN MONETARY UNION. In 1865 France, Italy, Belgium and Switzerland united under this title in an association to regulate their coinage. For many years these countries had had a practically uniform system, and the coins of each country had circulated freely in the others. In 1864, however, France had reduced the value of its minor coins, and the result was confusion so far as international circulation was concerned.

By the treaty of 1865 the weight and fineness of the gold and silver coins were regulated, and it was provided that the gold coins and the silver five-franc pieces might be issued in unlimited quantities and should circulate freely, as before. The coinage of the smaller silver coins was limited. Ten years later the coinage of the silver five-franc piece was limited, and a gold standard was definitely adopted.

LAT'ITUDE, a term in geography used to designate the distance of any point on the earth north or south of the equator. Such distance is measured in degrees, the equator being 0° and each of the poles 90° from the equator; that is, the distance from the equator to a pole is one-fourth of a great circle drawn around the earth and passing through the poles. Places north of the equator are said to be in *north latitude;* those south of it are in *south latitude. Parallels of latitude* are imaginary



DIAGRAMS SHOWING LATITUDE

lines drawn around the globe parallel to the equator, the important ones being the *Arctic* and *Antarctic* circles and the tropics of *Cancer* and *Capricorn.* It is worthy of note that the highest civilization on the earth lies between 25° and 60° north latitude, and that the earth's greatest cities in the northern hemisphere are quite close to the 40th parallel of north latitude.

A degree of latitude at the equator is equal to about sixty-eight and seven-tenths common miles; at latitude 40° a degree is nearly equal to sixty-nine miles. The length of "the middle degree," that is, at places in latitude 45°, is 364,606 feet, a little over sixty-nine miles. The distance in degrees east or west of any north and south line is called *longitude* (which see).

Related Subjects. The reader is referred in this connection to the following articles in these volumes:

Antarctic Circle
Arctic Circle
Degree
Equator
Geography
Longitude
Pole
Tropics
Zone

LATIUM, *la'shi um,* in ancient geography, was that part of Central Italy along the coast of the Mediterranean Sea, southeast of Etruria and northwest of Campania. Its chief cities formed a league which warred with the Romans from 340 to 338 B. C., after which it was incorporated with Rome. Its location nearly coincides with the modern Campagna di Roma, which surrounds the city of Rome, but the ancient province was much more highly cultivated and more thickly peopled. Latium was occupied by the Latins, Hernicans, Volscians, Auruncans and the Aequi.

ANCIENT LATIUM
(1) Etruria
(2) Liguria
(3) Gallia Cisalpina
(4) Venetia
(5) Umbria
(6) Picenum
(7) Sabini
(8) Aequi
(9) Freutani
(10) Samnium
(11) Apulia
(12) Campania
(13) Lucania
(14) Peucetii
(15) Calabria
(16) Bruttii

LATROBE', PA., a manufacturing borough in Westmoreland County, situated in the southwestern part of the state, on Loyalhanna Creek. Pittsburgh is forty-one miles northwest. Transportation is provided by the Pennsylvania and the Ligonier Valley railroads, and electric lines operate to towns in the vicinity. Latrobe is located in a district rich in deposits of coal and iron. The people are engaged principally in coal mining, and in making paper, woolen goods and glass. There are also large coke ovens here. Noteworthy buildings are Latrobe Hospital, Saint Vincent's Monastery, Saint Xavier's Convent and the high school. In 1910 the population was 8,777; in 1916, by Federal estimate, it was 11,393.

LATTER DAY SAINTS, REORGANIZED CHURCH OF JESUS CHRIST OF, a religious sect with headquarters in Laomi, Iowa. It was organized in 1852 by Joseph Smith, son and namesake of Joseph Smith, founder of the Mormon Church. It accepts some of the doctrines of Mormonism, but holds that after the death of its founder the control of the Mormon body should have passed to his son; and it has always rejected the practice of polygamy. The Iowa group is known as "Reorganites" (the name "Josephites" is condemned by Mormon

authorities) by the Mormons proper, while they retort in kind by applying the name "Brighamites" to the Utah Church. The Reorganized Church has a membership of over 65,000 communicants, and 1,700 ministers. Its present head is Frederick Smith, grandson of Joseph Smith. See MORMONS. M.M.B.

LA TUQUE, *lah took',* a town in Champlain County, Quebec, on the right bank of the Saint Maurice River, at its confluence with the Bostonnais River. La Tuque is about eighty-five miles directly northwest of the city of Quebec; by rail the distance is 118 miles via the Canadian Northern and 130 miles via the Transcontinental Railway. La Tuque is the terminus of a branch of the former and is on the main line of the latter. The town is in a lumbering region, and is known for its large saw and pulp mills. The town hall and the Roman Catholic convent and college are worthy of mention. Population in 1911, 2,934; in 1916, about 3,200.

LAUD, *lawd,* WILLIAM (1573-1645), an English prelate who is remembered chiefly for his severity against the Puritans during the reign of Charles I. Shortly after his ordination to the priesthood, in 1601, he openly displayed his contempt for Puritanism, and when, after rising steadily through several high Church positions, he was made Archbishop of Canterbury (1633) by Charles I, he coöperated with the king in every possible way to force the Puritan dissenters to conform to the established forms of worship. Proceeding against them by means of fines, imprisonment and exile, he won the bitter hatred not only of the people as a whole, but of Parliament. His course of tyranny was finally checked when he attempted to force upon the Scotch the forms of worship prescribed by the English Church. In 1641 he was arrested and sent to the Tower, and two years later was condemned to death by Parliament on a charge of treason and other crimes. In January, 1645, he was beheaded.

LAUDANUM, *law'da num,* a powerful and dangerous fluid preparation, containing forty-eight grains of opium to the ounce. The name is derived from the Greek *ledanon,* meaning *resinous juice* or *gum of a certain shrub.* It is prepared by softening powdered opium in alcohol and straining off the liquid portion. In color it is a dark brownish-red, and the odor is that of opium. It is all too frequently administered as a domestic remedy for pain or sleeplessness by those ignorant of its power. Extreme caution should be taken in giving it to infants for its soothing effects, as very small doses have been known to prove fatal. A person who has taken an overdose of laudanum should be given an emetic, or the drug should be expelled with a stomach pump. Artificial respiration is often resorted to in desperate cases. Walking people about and giving them strong coffee as a stimulant are other helpful remedies. At the present time morphine and codeine are frequently used as substitutes for laudanum. For restrictions regarding distribution of drugs derived from opium, in the United States and Canada, see OPIUM. W.A.E.

LAUGHING GAS. See NITROUS OXIDE.

LAUGH'LIN, JAMES LAURENCE (1850-), an American economist, born at Deerfield, Ohio. He was educated at Harvard and the University of Geissen, Germany, and from 1878 to 1887 was connected with the department of political economy at Harvard University. In the latter year he became president of the Manufacturers Mutual Fire Insurance Company at Philadelphia. In 1890, however, he returned to university work as professor of political economy at Cornell and two years later entered upon his most important work as head of the department of political economy at the University of Chicago. He is one of the most accurate economic investigators in America and has done valuable work in applying the principles of his subject to modern conditions and needs. In 1894 he prepared the plan for the present financial system of San Domingo, served as a member of the Monetary Commission appointed by the National Monetary Convention in 1897 and as a member of the Pan-American Scientific Congress in 1909. In 1913 he was frequently consulted by the framers of the Federal Reserve Bank Act, and his advice was followed in many provisions of the finished bill. He has made a special study of finance, and has written such valuable books on the subject as *The History of Bimetallism in the United States, Prices Since 1873, Facts about Money* and *The Principles of Money.* Other important works are *The Elements of Political Economy,* a textbook, and *Industrial America.*

LAUNDRY, *lawn'dri,* a room or building where clothes are washed and ironed, or an establishment where such work is carried on as a business. This article deals only with the steam laundry, an establishment of rather recent origin which has become industrially important in all civilized countries.

In this type of laundry, steam is used in running the machinery and heating the water, and sometimes ironing devices are also heated by steam. The quality of the water employed is of considerable importance. If only hard water be obtainable, then the water must be artificially softened. In the best modern laundries clothes first go through a disinfecting process, during which they are bathed in steam at high pressure. They are then placed in washing machines, which may be either revolving or stationary. In the first kind the clothes are cleaned by being agitated by revolving cylinders, while in the stationary machines they are beaten by plungers. They may be boiled in the same machine.

After the clothes are thoroughly cleansed, they are passed through a wringer and sent to artificially heated drying-rooms, through which air is kept circulating by fans. The ironing machine consists of some form of hard, polished metal surface, heated by steam or electricity, which presses the clothes against another smooth surface, usually covered with a felt padding and a cotton sheet. Many varieties of ironing devices are in use.

There are over 5,000 steam laundries operating in the United States, representing an investment of about $69,000,000. The receipts for a single year are about $105,000,000. The six cities doing the largest amount of business are, in order, Chicago, New York, Philadelphia, San Francisco, Los Angeles and Saint Louis. The Dominion government presents no statistics for the industry in Canada.

LAUREATE, *law're ate.* See POET LAUREATE.

LAUREL, *law'rel,* a family of trees and shrubs remarkable for their aromatic properties, including such well-known medicinal plants as the sassafras, benzoin and camphor trees. The name is probably most familiarly associated with the *bay,* or *sweet* laurel, whose graceful evergreen leaves formed the wreaths which crowned the victors in the ancient games (see BAY TREE). The name is also applied to plants of other families, notably the *cherry* laurel and the *Portugal* laurel, both of which belong to the rose family, and to the beautiful *mountain* laurel, a member of the heath family. The latter is described in the article KALMIA.

The Laurel in Legend. In classic mythology the laurel tree was sacred to Apollo, the sun god. According to the legend, he loved and wooed the beautiful nymph Daphne, daughter of the river god Peneus. Delighting only in woodland sports and in the spoils of the chase, Daphne sought to elude her handsome lover. Though she fled swifter than the wind she saw that she could not escape, and so called to her

THE LAUREL

The laurel branch, and the crown of laurel, "meed of mightie conquerours and poets sage."

father for help. Thereupon he changed her into a laurel tree, ever afterwards sacred to the sun god.

LAUREL, MISS., the county seat of Jones County, and a center of the lumber industry. It is situated in the southeastern part of the state, on the Tallahoma and Tallhala creeks, twenty-nine miles northeast of Hattiesburg, ninety miles southeast of Jackson and 139 miles northeast of New Orleans. Transportation is provided by the New Orleans & North Eastern, the New Orleans, Mobile & Chicago and the Gulf & Ship Island railways. Laurel is a city of rapid growth, as it had only 100 inhabitants soon after its settlement in 1894. It was incorporated as a city in 1900. In 1910 the population was 8,465; it had increased to 11,779 in 1916 (Federal estimate). The commission form of government, with three elective officers, was adopted in 1913. The area of the city is four square miles.

Laurel is located in a district which produces yellow pine in such abundance that many of its handsome residences are built of it, and some of its streets are made of creosoted yellow pine. The city owes its existence to the establishment of extensive sawmills, which have sufficient timber available to last for many years. In addition to the lumber mills, there are cotton mills with 10,000 spindles, employing 400 people, a brick and tile plant with a daily output of 30,000 bricks, a large fertilizer establishment, a knitting mill and a cotton compress. Notable buildings are the city hall, the Y. M. C. A. building and the Eastman Gardiner office building, erected in 1914 at a cost of $150,000.

An $85,000 post office was in course of erection in 1916. In the vicinity is the state agricultural farm.

LAURENS, *law'renz,* HENRY (1724-1792), an American statesman of the Revolutionary period. He was born at Charleston, S. C., and early became a conspicuous figure in the patriotic group which opposed British aggression, being one of thirty-eight Americans who signed a petition to dissuade Parliament from passing the Boston Port Bill (1774). In 1775 he became a member of the First Provincial Congress and was elected president of the Continental Congress in 1777. Laurens was sent to Holland in 1779 to negotiate a commercial treaty, but was captured at sea by the British and imprisoned in London Tower for fifteen months. Twice he refused offers of pardon, for each time it was made a condition that he serve the British ministers. In 1782, with Adams, Jay and Franklin, he signed the preliminary articles of peace between the United States and Great Britain (1782), but failing health prevented his remaining in Paris for the negotiation of the final treaty.

LAURENTIAN, *law ren'shi an,* **PLATEAU,** or **LAURENTIAN SHIELD,** a vast region in North America, comprising more than one-half of the total area of Canada. It is shaped roughly like a shield surrounding Hudson Bay on the east, south and west, and forming a large part of the great islands to the north. On the east it forms the Labrador peninsula. On the south it extends through the province of Ontario as far as Lake Superior and Georgian Bay. West of Hudson Bay the shield spreads to the northwest, its western edge being not far from and parallel to the Mackenzie River. The highlands of the part of the shield lying in Quebec north of the Saint Lawrence River are frequently called the Laurentian Mountains, but of mountains in the usual sense of the word there are none.

Surface and Drainage. The physical features of the shield are nearly uniform throughout its 2,000,000 square miles of area. Its average elevation is about 1,500 feet, but it is highest towards the margin and dips gently down to sea level around Hudson Bay. Along the eastern border, on the coast of Labrador, are the highest levels, rising in the Nachvak Mountains to an altitude of 5,000 or 6,000 feet. The surface is hilly, or hummocky, for the harder rocks, such as granite, stand out as rounded knobs or narrow ridges. Viewed from the valley of the Saint Lawrence the effect is that of mountains, but an observer stationed on one of the higher hills can see that the region was once a plain, for all the hills rise to about the same level and form a uniform skyline.

The most characteristic feature of the region is the innumerable lakes, of all sizes, with which it is covered. These lakes and the winding rivers flowing in all directions form so nearly continuous a series of waterways that it is possible, by making occasional portages, to travel in any direction in a canoe. The winding courses of the rivers, flowing from almost every lake, are due largely to the presence of soft rocks in company with granite and other hard rocks. The larger lake basins have been formed partly by the removal of the softer rocks, but mainly by the damming of valleys through glacial deposits. The rivers generally have no regular channels, but spill over from one basin into the next, though a few of them cross the edge of the shield and flow in very deep, high-walled valleys cut in solid rock. The most famous of these, the Saguenay and Hamilton rivers, flow between walls 1,500 to 1,800 feet high, and end in long valleys floored by the sea. They are good examples of fiords, comparable to those of Norway.

The watershed between the Hudson Bay rivers on the one side and the Great Lakes-Saint Lawrence system and the Mackenzie system on the other is very irregular and often low and marshy without any continuous range of hills or mountains. There are lakes on the divide which send part of their waters to the Great Lakes and part to Hudson Bay.

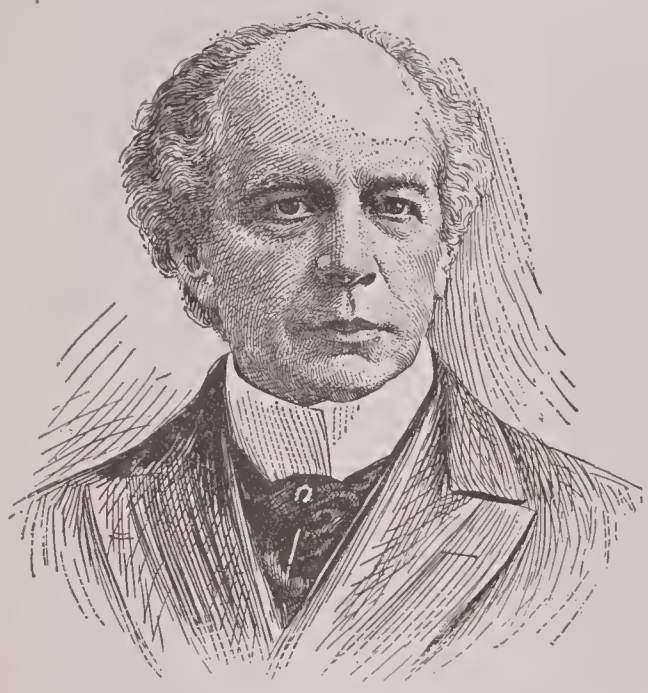
Soil and Vegetation. On the ridges the soil is generally thin, but in the valleys it is often very rich and productive. The southern part of the Laurentian region includes immense stretches of forest land, which are, with the possible exception of British Columbia's forests, the Dominion's chief source for timber. In the far north, on both sides of Hudson Bay, are the *barren lands,* hills and valleys on which grow only grasses, mosses and lichens. Gold, silver, nickel, copper and iron are mined in various sections, and fur-bearing animals are common nearly everywhere.

Oldest Part of North America. When the wrinkling of the earth's crust first caused the land to rise above the water, the first part of North America to appear was the Laurentian shield. This was followed by the Appalachian system, and later by the Rocky Mountains system. Between these three mountain masses

lay a great stretch of shallow water. The Laurentian shield was originally much higher than it is to-day, but heat and cold, rain and snow and the great glaciers which once covered the region all had effect, and the highlands were gradually worn down. The Laurentian shield thus supplied the greater part of the material which formed the great central plains of the continent. A.P.C.

For further details, consult CANADA, subtitle *Physical Characteristics of the Dominion;* LABRADOR; QUEBEC.

LAURIER, *lo'ri a,* SIR WILFRID (1841-), a Canadian statesman, Premier of the Dominion from 1896 to 1911, the first French-Canadian to hold this office. His Premiership was not merely the longest, but in some respects



SIR WILFRID LAURIER

the most important, since Confederation. During those fifteen years Canada passed through a period of growth and development which left a nation scarcely recognizable as the Dominion of 1867. Conspicuous has been the expansion of Canadian railways, of agriculture and manufactures. More significant is the growth of Canadian nationality within the broad field of British imperialism, a greater national consciousness allied with a stronger feeling of kinship for all other parts of the British Empire. Of the many features of those fifteen years the outstanding ones are the enactment of special tariffs for goods imported from Great Britain, the participation of Canadian troops in the South African War, the contract for the construction of the Grand Trunk Pacific Railway, the adoption of two-cent postage for letters between Canada, Great Britain and the United States, the organization of the provinces of Alberta and Saskatchewan, and finally, the failure of the reciprocity agreement between the United States and the Dominion. This agreement, opposed by a majority of the Canadian people, ended the Laurier Ministry's lease of power.

Laurier was born at Saint Lin, Que., on November 20, 1841. Like all the children of the neighborhood the boy attended parish elementary school, but he had the added advantage of nine months' study in a Presbyterian school, where he learned to speak English. Association with English-speaking Presbyterians, moreover, seems to have had a permanent influence on his religious and racial views. At twelve he entered L'Assomption College, and at nineteen began to study law at McGill University. At graduation he was class valedictorian, an honor which he grasped to appeal for sympathy and understanding between the French and the English in Canada. This appeal was no less characteristic of him as Premier of the Dominion than as class valedictorian. When he had power, he did as he urged others to do many years before.

Early Political Career. For about six years after his call to the bar in 1864, Laurier divided his time between journalism and law. He edited a newspaper of extreme French sentiment, and at the same time associated with persons who were not in favor with the Roman Catholic Church. Like all the Quebec Liberals, Laurier opposed Confederation, because it would "prove the tomb of the French race and the ruin of Lower Canada." These fears were groundless, and a few years later Laurier himself was conspicuous in Dominion politics. After three years in the Quebec assembly, he entered the House of Commons in 1874, and in 1877 became Minister of Inland Revenue in the Mackenzie Cabinet.

In 1878 began the long period of Liberal opposition, which ended in 1896 with the elevation of Laurier to the Premiership. During the first half of the intervening eighteen years Laurier was Edward Blake's first lieutenant, and during the latter half he was the acknowledged leader of the Liberals. In 1887, when Laurier succeeded Blake, the memory of Riel's execution and the militant nationalism of the French-Canadians, added to Laurier's race and religion, made his task doubly difficult, yet from the first he won the favor of the English-speaking Liberals. The Liberals lost the gen-

eral elections of 1891, but in 1896 were triumphantly returned.

The First French-Canadian Premier. One of the chief issues of the campaign related to the Manitoba separate schools. Although himself a Catholic, Laurier opposed the Dominion bill which was intended to force the Manitoba government to restore the Roman Catholic separate schools. On this issue, and on the plank of moderate tariff revision, the Liberals won a sweeping victory. The principal events of the next fifteen years are referred to elsewhere (see CANADA, subtitle *History of Canada*) and have also been mentioned above. The settlement and exploitation of the Canadian Northwest is likely to be considered, a century hence, as the greatest achievement of this period. In 1910 Sir Wilfrid arranged a reciprocity treaty with the United States, but when the issue was submitted to the voters at the general elections of 1911, the verdict was against reciprocity. The Laurier Ministry resigned on October 6, 1911, and Sir Wilfrid again became leader of the opposition. On the outbreak of the War of the Nations he ably seconded Sir Robert Borden's appeals for loyalty and service to the Empire, and although still in opposition he declined in any way to embarrass the government in its war policies. This exhibition of restraint, though it could not add to the regard which Canadians have for Laurier as a man, was evidence to the world of a new Canadian nationalism, in which party interests and self-seeking were lost to view.

Sir Wilfrid bears a striking facial resemblance both to Sir John A. Macdonald and to Benjamin Disraeli, Earl of Beaconsfield. Public interest in this fact was noteworthy during his first visit to England in 1897, on the occasion of Queen Victoria's Diamond Jubilee. Laurier is a speaker of genuine eloquence, without doubt one of the greatest of Canadian orators. He is not merely a skilful party leader, but a statesman of vision, who keeps the respect of his opponents as well as the loyalty of his followers. On the many occasions when he has represented the Dominion—at the Imperial Conferences in London in 1907 and 1911, at the sessions of the Joint High Commission at Washington in 1898 and 1899, at every conference in which he has taken part—his presence has insured a dignity and integrity which is as characteristic of him in private affairs as it is in public life. W.F.Z.

Consult Willison's Sir Wilfrid Laurier and the Liberal Party.

LAURIUM, *law'ri um,* MICH., is a village in Houghton County, in the Keweenaw Peninsula, the extreme northwestern part of the state. It is seventeen miles northeast of Houghton and seven miles from Lake Superior. Laurium and Red Jacket comprise the township of Calumet. The town is served by the Copper Range and the Mineral Range railroads. In 1910 the population was 8,537; in 1916 it was 10,356 (Federal estimate).

Laurium was incorporated as a village under its present name in 1895. It is in one of the richest copper-ore regions in the United States, in the vicinity of the Calumet and Hecla and other rich mines. Copper mining and associated industries are of chief importance.

LAUSANNE, *lo zahn',* the capital of the Swiss canton of Vaud, situated about one-half mile from Lake Geneva, from which a cable railroad runs to the central railway station and the upper city. The town is built on and around five hills, two of which are connected by a lofty viaduct. The beautiful Gothic cathedral, the finest ecclesiastical building in Switzerland, built in the thirteenth century, is an imposing landmark, and from the town there is a fine view of the lake and the mountains of Savoy and Valais. The opening of the Simplon tunnel in 1906 added greatly to transportation facilities and placed Lausanne on a commercial basis never before attained.

Close to the cathedral is a castle, built early in the fifteenth century, also the Palais de Rumine, containing an important local university and the cantonal library of 150,000 volumes. In recent years Lausanne has undergone modern improvements, and many of the older picturesque buildings have been destroyed or altered beyond recognition.

The city is visited by a great number of tourists and is well provided with hotels. It is as an educational center, however, that Lausanne is most famous, the splendidly conducted institutions attracting many foreign pupils. The population in 1910 was 63,926; the people are largely Protestants, and the French language is spoken.

LAUT, AGNES CHRISTINA (1872-), a Canadian journalist and author, best known for her biographical and historical sketches. Miss Laut was born at Stanley, Ont., but removed to Winnipeg during her childhood. She attended the University of Manitoba for three years, until ill health compelled her to withdraw. Ill health was not entirely a misfortune, for she spent the following summers

in the Rocky and Selkirk mountains, her knowledge of which was later of untold value to her. In 1895 she became an editorial writer on the *Manitoba Free Press,* at Winnipeg, and after 1897 was a frequent contributor to other Canadian and American newspapers and journals. Her first important book, *Lords of the North,* appeared in 1900, and was followed at irregular intervals by *Heralds of Empire; Pathfinders of the West; Vikings of the Pacific; The Conquest of the Great Northwest* and *Freebooters of the Wilderness.* One of her later books is entitled *Through Our Unknown Southwest, the Wonderland of the United States.*

LAVA FORMATIONS

At left, grotesque shapes on a mountain side; at right, lava as it flowed through the streets of a mountain village, destroying everything in its path.

LAUZON, *lo zoN',* a town in Lévis County, Quebec, on the south bank of the Saint Lawrence River, two miles northeast of Lévis and about five miles east of the city of Quebec. It is on the Intercolonial and Quebec Central railways, and also has connection with Lévis by electric tramway. Lauzon's factories make window blinds, trunks and valises, boxes and aërated waters. There are two large dry docks, and shipbuilding and repairing is an important industry. The town was named for Jean de Lauzon (1582-1666), at one time president of the Hundred Associates, owner of the island of Montreal, and from 1651 to 1656 governor of New France. Population in 1911, 3,978; in 1916, about 4,200.

LAVA, *lah'va,* rock which flows or has flowed from volcanoes in a molten state. When cooled it forms rocks of different sorts, such as tufa, basalt and trachyte. Lava is not simply molten rock; it contains as well several minerals in solution in the molten matter. When lava cools these crystallize as they become solid, therefore rocks formed from lava are usually crystalline (see Crystalline Rocks). If cooled rapidly lava forms a compact rock; if cooled slowly, it becomes a porous rock, brittle and easily crumbled. We usually associate lava beds with volcanoes, but in past geologic ages great quantities of lava were forced up between other layers of rock. In volcanic regions lava beds are found on the sides and at the base of the volcanoes. The regions around Mount Vesuvius in Italy, Mount Etna in Sicily, and the Hawaiian Islands contain lava beds of recent formation. No lava flowed from Vesuvius, for instance, until the year 1066. See Volcano.

LAVAL, UNIVERSITY (in French, Université Laval), *la vahl',* a leading Canadian Roman Catholic institution for higher education. The university was founded in 1852 by the Seminary of Quebec, itself an institution established as a training school for priests by Bishop Laval in 1668. The seminary is still flourishing. The university received its charter, signed by Queen Victoria, in 1852, and was recognized by a Papal bull of Pope Pius IX in 1872. There are four faculties—theology, law, medicine and the arts. Under the terms of its charter, the Roman Catholic archbishop of Quebec is the Visitor and Chancellor of the University, and appoints professors in the faculty of theology. A university council, composed of the directors of the Seminary and the three senior professors of each faculty, nominates all other members of the faculty. The Superior of the Seminary is

ex officio rector of the University. The average enrolment of students is about 475, and the faculty numbers about seventy.

In 1876 it was decided to establish a branch of Laval University at Montreal. Of this branch the archbishop of Montreal is vice-chancellor. Since 1889 the university at Montreal has been practically independent in matters of administration and instruction, but degrees are awarded only by the university at Quebec. At Montreal there are about a thousand students.

François Xavier de Laval-Montmorency (1623-1708), for whom Laval University was named, was the first Roman Catholic bishop of Quebec. He was born at Laval, France, became a priest in 1653, and in 1659 was sent to Canada as Apostolic Vicar. He established the Seminary of Quebec in 1663, and in 1680 gave all his property to it. He was consecrated titular bishop of Quebec in 1674, but resigned in 1685, and thereafter gave most of his time to the direction of the Seminary. Laval was a man of conspicuous ability, and was for many years one of the greatest figures, if not the most powerful man, in Canada. Unfortunately, however, his zeal for the Church led him into frequent quarrels with the civil officials, notably Frontenac. He strongly opposed the sale of liquor to the Indians, a practice countenanced by many of the governors. His influence, especially before his resignation as bishop, was tremendous, and to a large degree determined the paternalistic character of French colonial government in Canada. W.F.R.

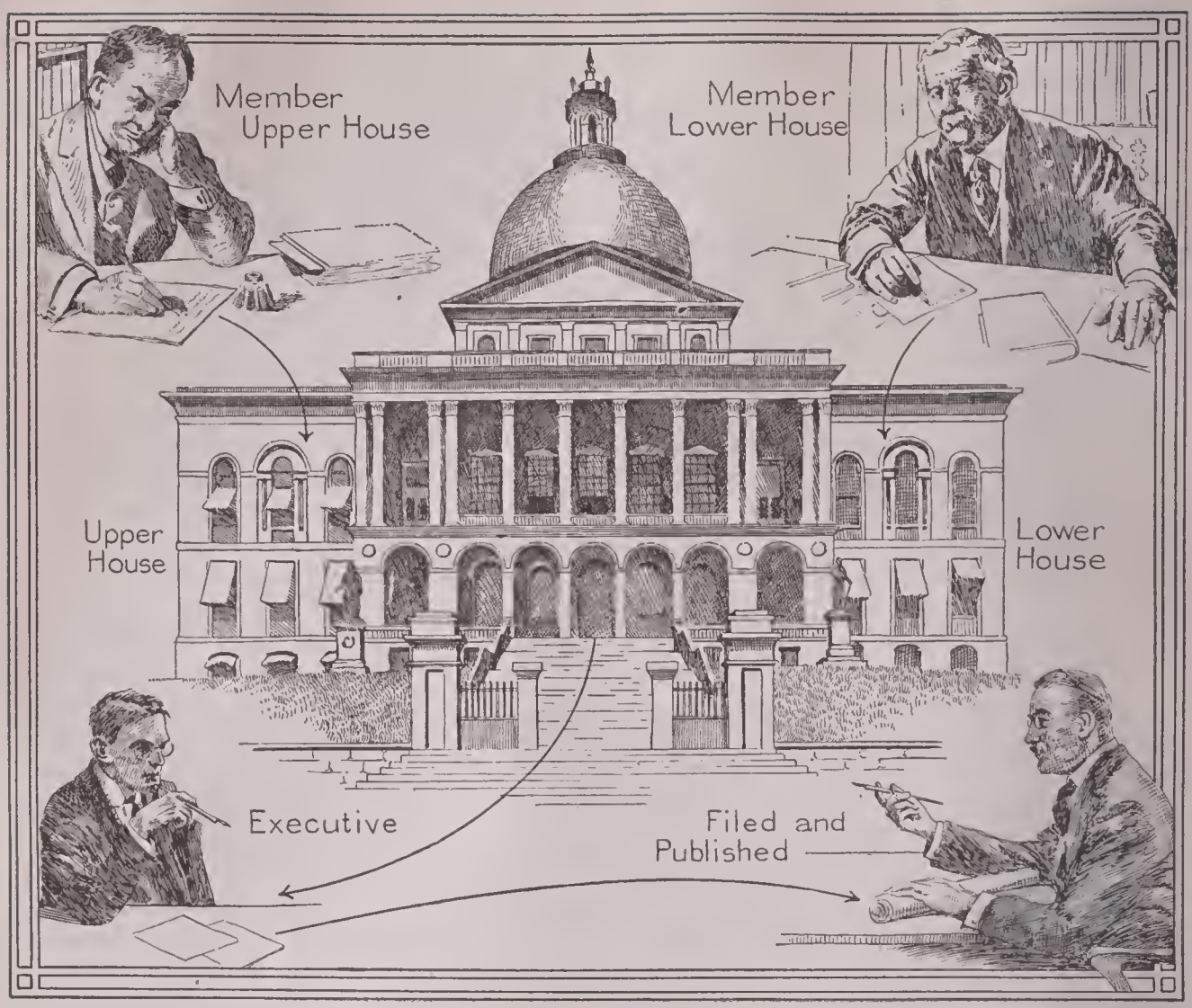
LAV'ENDER, a flower and shrub, about which is woven a halo of sentiment. For many years fine ladies and dear old-fashioned grandmothers have used it to scent their linens, and so the faint, sweet, musty odor has become quite generally associated with purity and fragrance. *Lavender and Old Lace,* a charming story told by Myrtle Reed, typifies the veneration in which lavender is held. The name comes from the Latin *lavare,* meaning *to wash,* and was given because of the ancient use of lavender in bath waters.

The little bush, from three to four feet high, grows wild in countries about the Mediterranean Sea. It is easily cultivated from cuttings or divisions of older roots, and thrives in all temperate climates, growing best in a sandy, well-drained soil. The gray-green leaves, which are fragrant like its flowers, are long and narrow. The little, pale-purplish blossoms, whose characteristic hue has added the word *lavender* to our vocabulary of colors, grow in whorls about a stalk. When properly dried, they retain their fragrance for a long time. From the leaves is obtained an oil which is used medicinally as a stimulant.

LAW, as related to government, is a system of rules designed to bring the conduct of the individual into harmony with the recognized practice of his fellow men. It is intended to give direction to individual actions that are regarded as essential to the welfare of the group.

In its origin, law is only custom. The individual acts or refrains from acting in a certain way. Precedent is thus established. With the setting up of tribunals, the process of law building is hastened. Judges find rules in interpreting popular customs and by consulting earlier decisions. Thus out of social habits there has gradually been evolved one of the three great branches of law—the *common law.* Early judges did not always find in custom a sufficient guide in reaching their decisions, so they began to apply the tests of common sense and their own notions of justice. In other words, they began to make laws for themselves, and this was the origin of the *law of equity.* In England, Canada and the United States, equity is recognized as judge-made law. The third branch of law, *statutory law,* is enacted by the legislature.

All law may be grouped under two heads, technically known as *substantive* and *adjective,* or remedial. The former serves to define the normal relations which the individual sustains to the state and his fellows; the latter deals with violations of the established order and punishes crimes. Substantive law, again, is divided into *public law,* which has to do with the state and its relations, and *private law,* which concerns private persons and property. Further subdivisions of substantive law are too numerous to be treated adequately in a general survey. It will suffice to say that substantive law deals with such matters as the relation of the citizen to the state, property rights, inheritance, the family, contracts, and so on. Constitutional law, which is a division of public law, regulates the organization of the state and the relation of its several parts. Administrative law concerns itself with the procedure of the several organs of government. International law, even in its most modern development, is almost wholly based on custom. No adequate machinery exists for coercing delinquent nations



HOW A BILL BECOMES A LAW

In either house of the English or Canadian Parliament or of the American Congress any member may introduce a bill which he seeks to have enacted into a law. He presents this bill in the house of which he is a member; it is referred to a committee, which discusses its merits and eventually may report it favorably for passage. If it passes the house in which it was introduced it goes to the other house, where it must be voted upon. In case it passes this second vote it then is sent to the executive authority, the President or Governor-General, for his approval. If he signs it, it becomes a law and is forwarded to the Secretary of State to be filed and published. If the bill fails to pass either house or if the executive will not sign it it cannot become a law unless passed over the veto.

Remedial law, or the law which applies remedies, concerns itself with the redress of wrongs, the punishment of criminals and the classification of crimes and penalties. In point of fact these two main branches of the law, the remedial and the substantive, overlap, since both have for their purpose the protection of society. It is impossible to give in detail here the treatment of laws by the various peoples. The chief divergences may be found in the articles upon the leading nations.

United States Law Schools. There are more than a hundred in the United States, teaching over 20,000 students every year. Most of them are connected with universities. The first school existed at Litchfield, Conn., from 1784 to 1833, and was founded after earlier attempts to establish legal lectures at colleges had failed. Several of the best university law schools, including those of Yale, Pennsylvania, Michigan and Northwestern universities, were established between 1830 and 1860. The *case system* of instruction, in which individual analysis of legal decisions supplants the study of textbooks, was established at Harvard in 1870 and is now employed by most of the leading schools. Pennsylvania and Harvard law schools admit only holders of college degrees, and several others require students to have completed from one to three years of college study.

Canada Law Schools. In Canada there is a faculty of law at each large university. Roman and civil law are given greater emphasis than in the United States. In both countries the course of study is usually three years, for which

the degree of Bachelor of Laws (LL. B.) is given. Laval University follows the French system, giving also the degree of Licentiate.

What Sort of Boy Should Study Law. In the days when education was a treasure possessed by comparatively few, almost every young man who could read or write was encouraged to enter the ministry or the profession of law. To-day this would seem absurd, yet those people make just as radical an error who believe that all boys who are good speakers should become lawyers, and all with a well-developed moral sense, ministers. The practice of law requires much more than the ability to speak in public. There is perhaps no occupation so trying on the morals and on integrity as the legal profession. Laws are attempts to introduce justice into the relationships of men; that they are constantly being changed is evidence that they are not perfect. Yet unless he watches himself very closely a lawyer will find himself testing proposed actions by the question, "Is it legal or illegal?" instead of "Is it right or wrong?" Thus even among men who consider themselves honest the law often becomes a cloak for moral dishonesty rather than a protection against illegality.

A successful lawyer must possess what is known as the legal mind; the ideal lawyer has the ability to see both sides of a case. It is obvious that at least one side in a dispute is wrong, and this is often true of both sides. Therefore many cases offered to lawyers are unjust or extravagant claims. A judicially-minded lawyer will anticipate the judge's decision in most of them, and advise his client to abandon or moderate his demands. He thus avoids losing his case in court and saves his client needless expense.

A boy should not decide upon a legal career because it is a "gentleman's profession" and because it appears to involve no hard work. There are no longer any "gentleman's professions." To-day every honest toiler may be a dignified member of his community; the most humble worker who is honest and clean is morally above the boy who feels that he must be a "gentleman." As to the law's ease, let it be recorded that small income, hardship and discouragement are more often the rule for the early years than in most other professions. The young man who turns to the law should be of a deeply-studious turn of mind, a clear thinker and a hard worker; and unless he wishes to take up a specialized form of practice he must be able to develop good speaking power—the fire that persuades juries. Added to the above, if he is fervent in his love of justice towards all men, he may feel that truly he is "called" to the bar. R.E.B.

Consult Holland's *Elements of Jurisprudence;* Markby's *Elements of Law;* Tourtoulon's *Philosophy in the Development of Law.*

Related Subjects. The following articles in these volumes treat of some of the various phases of law:

Accessory
Adoption
Affidavit
Age
Agent
Alias
Alibi
Anti-trust Laws
Appeal
Arrest
Assignment
Attachment
Attainder
Bail
Bankrupt
Barrister
Benefit of Clergy
Bertillon System
Bill of Attainder
Bill of Rights
"Blue Sky" Laws
Bona Fide
By-law
Capital Punishment
Chancery
Chattel
Civil Law
Claims, Court of
Code Napoleon
Commercial Law
Common Carrier
Common Law
Contempt
Contract
Convict Labor
Copyright
Courts
Crime
Criminology
Deed
Demurrer
Easement
Eminent Domain
Enemy
Equity
Estate
Evidence
Executor
Expectation
Ex Post Facto
Extradition
False Imprisonment
Finger Print Identification
Flotsam, Jetsam and Ligan
Franchise
Garnishment
Garrote
Guarantee
Guardian
Guillotine
Habeas Corpus
Hanging
Heir
High Seas
Homestead Laws
Husband and Wife
Impeachment
Imprisonment for Debt
Indeterminate Sentence
Indictment
Injunction
International Law
Intestacy
Judge
Judgment
Jury and Trial by Jury
Juvenile Court
Labor Legislation
Lease
Legacy
Libel
License
Lien
Limitations, Statute of
Lynch Law
Malice
Mandamus
Martial Law
Morals Court
Mortgage
Navigation Laws
Negligence
Neutrality
Notary Public
Nuisance
Oath
Parent and Child
Parliamentary Law
Patent
Peer
Perjury
Personal Liberty
Personal Property
Petition
Pillory
Power of Attorney
Preëmption
Primogeniture
Prison
Probate
Procedure
Proxy

Public Defenders	Title
Pure Food Laws	Torrens System
Quorum	Tort
Rack	Torture
Real Estate	Treadmill
Reform Schools	Treasure-trove
Replevin	Trespass
Retainer	Trustee
Riparian Rights	Usury
Search, Right of	Wager
Slander	Warrant
Statute	Wheel
Subpoena	Will
Sumptuary Laws	Witness
Supreme Court	Writ

The following jurists and lawyers are given separate treatment in these volumes:

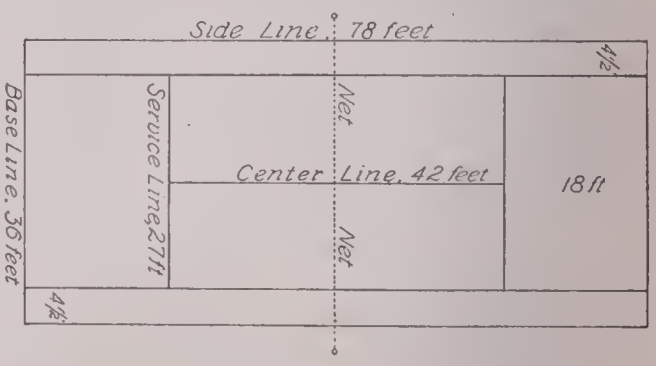
Alverstone, Lord	Hughes, Charles Evans
Blackstone, Sir William	Ingersoll, Robert Green
Brandeis, Louis	Jay, John
Chase, Salmon P.	Jeffreys, Lord
Choate, Joseph Hodges	Kent, James
Choate, Rufus	Lamar, Lucius Quintus Cincinnatus
Davis, David	Lindsey, Benjamin Barr
Duff, Lyman P.	Marshall, John
Falconbridge, Sir Wm. G.	Reading, Baron
Field, David Dudley	Story, Joseph
Field, Stephen Johnson	Taney, Roger Brooke
Fuller, Melville Weston	Waite, Morrison Remick
Gray, George	Wharton, Francis
Harlan, John Marshall	White, Edward Douglass
Holmes, Oliver Wendell, Jr.	Wilson, James

LAW, Andrew Bonar (1858-), a British statesman, born in New Brunswick, Canada. When he was twelve years of age his parents removed to Glasgow, Scotland, and he completed his education in the Glasgow High School. At the age of sixteen he was given a position in the iron works of which his uncle was the head. He learned the business thoroughly and became a successful iron manufacturer. He was chosen chairman of the Glasgow Iron Trade Association and showed marked ability in the discharge of his duties. In 1900 he was elected to the House of Commons for Glasgow as a Unionist. In 1902 he became Parliamentary Secretary of the Board of Trade and held the position until 1906. In 1911 he succeeded Arthur J. Balfour as leader of the Opposition, and in the reorganized Cabinet of Mr. Asquith in 1915, he was given the portfolio of Secretary of State for the Colonies. Before David Lloyd George succeeded Asquith as Premier in 1917 Law was asked to assume that post, but he declined, and became an associate of Lloyd George as Chancellor of the Exchequer and one of the five members of the powerful War Council.

LAW, John (1671-1729), a financier and speculator who became famous as the originator of a scheme to develop the resources of the province of Louisiana and the region bordering on the Mississippi, which was believed to be rich in precious metals (see Mississippi Scheme). He was born at Edinburgh, the son of a goldsmith and banker. Law displayed a remarkable aptitude for mathematics and kindred sciences when he was very young. He spent a great deal of time in Amsterdam, studying the credit operations of the bank, and about the year 1700 returned to Edinburgh. At this time he proposed to the Scottish Parliament that a paper currency be adopted, but his proposition was rejected.

Having made a fortune by gambling, he opened a bank in Paris. The Duke of Orleans became his patron and in 1718 he adopted Law's plan for a national bank. In 1717 he had originated his famous Mississippi Scheme; three years later, on the failure of the project and the collapse of the bank, he fled from France. Settling finally in Venice, he managed to make a poor living by gambling. He died in May, 1729.

LAWN TENNIS, a modern adaptation of an old game called tennis (which see), played on a hard court of grass, gravel, cinders, clay or asphalt, with balls and rackets. The balls, 2½ inches in diameter, are of rubber, covered

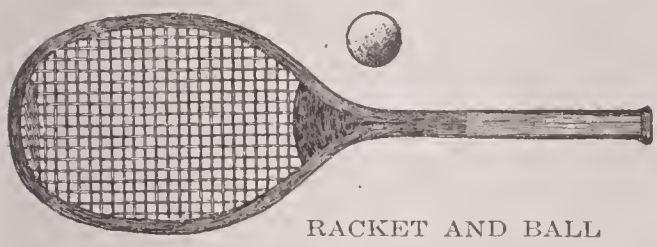


PLAYING FIELD

with white felt; the rackets, which are 8x15 inches, have frames of ash or hickory, with cedar handles, the frames being netted with tightly-strung, varnished gut. The *court* is 78x27 feet, marked out by white tapes or lime boundaries, with an *alley* 4½ feet beyond on either side, used only when four people play. A *net,* three feet high, divides the court into halves. Each side is divided again 21 feet from the net, and the space between this line and the net is bisected into rectangles, called *receiving courts.*

The object of the player who starts the game is to knock the ball with the racket into the opponent's court so he cannot return it.

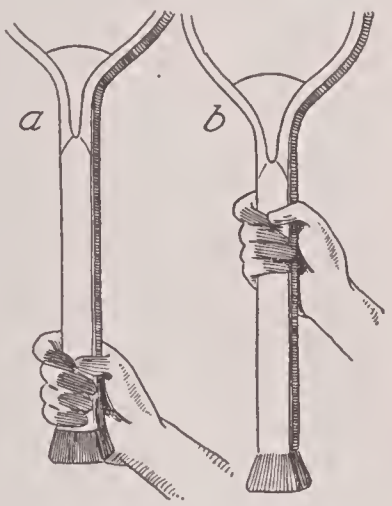
This player, called the *server,* stands on the right side of the farther line. He serves the ball with an overhead stroke so that it flies into the receiving court diagonally opposite him. Two balls are allowed for the serve. If both are *faults,* that is, if both fail to land



RACKET AND BALL

in the receiving court, the server loses and the receiver gains a point. The first ball must not bounce, but other balls may be returned either on the first bounce or before touching the ground. When one side or the other misses a ball, service begins again from the opposite side of the line, and so on, alternately. At the end of the game the receiver becomes the server, and vice versa.

Each ball missed scores the opponent a point. The first point is 15, the second 30, the third 40, the fourth 50, or *game.* If each player has three points (40) the score is called *deuce,* and two successive points must be made to win the game. The first point after deuce is called *advantage* (*ad* or *'vantage,* for brevity); if each has four points the score returns to deuce. When one side wins all the points before the opposite side has scored any, the round is called a *love* game.



HOLDING THE RACKET
(*a*) Correct position of hand; (*b*) incorrect position.

Six games make a *set,* unless each player has won five games, when two games in succession must be won to complete the set. Three out of five sets must be won to decide a championship. J.H.B.

Consult Myers' *Complete Lawn Tennis Player;* Wright and Ditson's *Official Lawn Tennis Guide.*

LAW'RENCE, James (1781-1813), an American naval officer, whose dying command, "Don't give up the ship," has become a watchword in the American navy, was born in Burlington, N. J. He was the son of a judge, and after attending the grammar school at home took up the study of law under his brother at Woodbury, N. J. Subsequently he took a course in the principles of navigation and naval tactics and joined the United States navy as midshipman in 1798.

He served on the *Ganges* in the West Indies and was made acting-lieutenant in 1800, receiving a lieutenant's commission in 1802. Lawrence distinguished himself in the war with Tripoli in 1804-1805, being one of the picked crew chosen by Captain Decatur to set fire to the *Philadelphia* (see Barbary States). He served as lieutenant on the *Constitution* in 1808, and had under his command at different times the *Argus, Wasp* and *Vixen,* vessels noted in early American history.

In 1811 Lawrence was commissioned captain and assigned to the *Hornet,* joining the squadron under Commodore Bainbridge off the coast of Brazil (see Bainbridge, William). He captured the English ship *Resolution,* and, later, in an engagement with the English brig *Peacock* the latter surrendered, the Americans losing only one man killed and two wounded. Lawrence received for this exploit a vote of thanks from Congress and a gold medal.

He was then given command of the *Constitution,* but was shortly afterwards transferred to the *Chesapeake,* a vessel with an indifferently trained crew and an unlucky reputation. Just after assuming command, Lawrence was challenged by the English vessel *Shannon,* June 1, 1813. While fighting bravely against what proved defeat, he was desperately wounded, but insisted on remaining on deck for a time before being carried below. His words uttered at this time, when he knew the situation to be hopeless—"Don't give up the ship"—were engraved on the quarterdeck of the *Chesapeake,* and on a monument erected in Trinity churchyard, New York. He died June 6, at the age of thirty-two, in Halifax, the port to which the captured *Chesapeake* had been taken, and was buried in Halifax, but his body was later returned to the United States government. Lawrence was one of the twenty receiving nominations for class N in the Hall of Fame (which see).

LAWRENCE, Kan., the county seat of Douglas County, situated in the eastern part of the state, thirty miles east and south of Topeka, the state capital, and forty miles west and south of Kansas City. It is situated on both banks of the Kansas River and is on the

Atchison, Topeka & Santa Fe and the Union Pacific railroads. The population in 1910 was 12,374; it increased to 13,324 in 1916 (Federal estimate). The area of the city is four square miles.

Lawrence is the seat of the state university (see KANSAS, UNIVERSITY OF); it has also Haskell Institute, one of the largest of the United States government industrial schools for Indians. This school has an average enrolment of 700 students and is maintained at an annual expenditure of $240,000. Prominent public buildings include the Federal building, courthouse, Y. M. C. A. building, Carnegie Library, opera house, Masonic Temple and club buildings. Woodland, containing eighty acres, and Central and South parks are attractive recreation spots. Lawrence is surrounded by a rich farming section. There are extensive nursery interests, and the industrial establishments include a canning factory, which has 1,500 acres under cultivation, and manufactories of flour, iron, paper, collars, shirts, sashes and doors and pianos. Water power is obtained from the river.

Lawrence was settled in 1854 by the Emigrant Aid Society, an antislavery organization from Massachusetts, and was named in honor of Amos A. Lawrence, of Boston. Before 1864 it was the scene of a number of anti- and proslavery conflicts. The city adopted the commission form of government in 1914.

LAWRENCE, MASS., the county seat of Essex County, is one of the principal worsted-cloth manufacturing cities in the United States and contains what is said to be the largest single woolen mill in the world. It is in the northeastern part of the state, twenty-six miles northwest of Boston and ten miles northeast of Lowell, and is served by several branches of the Boston & Maine Railroad and by interurban lines to Andover, Boston, Lowell, Haverhill and Salem, Mass., and to Nashua and Salem, N. H. The population in 1910 was 85,892; in 1916 the Federal Census Bureau estimated the number to be 100,560; of these forty-five per cent are foreign born, German, English, Irish and Scotch predominating.

The city includes within its limits Arlington District, Carltonville and Hallsville, and occupies an area of six and a half square miles. It is built along both sides of the Merrimac River, which in 1916 was being deepened to make it navigable thirty miles distant to the sea. An immense granite dam, built in 1845-1847, below a fall of twenty-six feet in the course of a half mile, crosses the river, 900 feet wide at this place, and furnishes about 12,000 horse power for manufacturing purposes. Two canals, parallel with the river, the one along the north shore a mile in length, the other along the south shore one-half mile long, conduct water to the factories and mills. Several bridges cross the river in the city.

Parks and Buildings. The Commons, one of sixteen parks of much natural beauty, occupies seventeen acres in the heart of the city, and about it are grouped many of the important buildings. These include the courthouse, of fine architectural design, the Federal building and the old city hall, the original "town house."

Institutions. The city contains a large public library, the Essex County Training School, a children's home, Cottage and Lawrence hospitals, and the experimental station of the Massachusetts State Board of Health. Social, benevolent and charitable organizations are maintained by the various nationalities of the city.

Industries. Lawrence buys more raw wool than any other single market, and annually produces more than $60,000,000 worth of woolen goods; the largest worsted mill employs 9,600 operatives. The cloth-printing works of the city employ 10,600 people. Other important local industries include the manufacturing of book, news, cartridge and calendered papers; paper mill machinery and cotton goods.

History. In 1845 an organization of manufacturers, financiers and merchants secured the site of the present city with the purpose of creating an important industrial center. The settlement was organized as a separate town in 1847 and named in honor of two of the chief promoters of the project. It was chartered as a city in 1853. The filtration beds of the city waterworks system, owned by the municipality, were constructed in 1892 under the supervision of the State Board of Health, and are among the finest of their kind in the United States. The commission form of government was adopted in 1912. G.E.R.

LAWTON, HENRY WARE (1843-1899), an heroic American military leader, who, after serving in several wars, gave his life for his country in the Philippine Islands. He was born in Manhattan, Ohio. In 1861, on the outbreak of the War of Secession, he became a volunteer in the Union army, and at its close was mustered out a brevet colonel of volunteers. In 1866 he entered the regular army as second lieutenant, served with conspicuous

bravery against the Sioux and Ute Indians and captured the Indian chief, Geronimo (which see), in 1866. He commanded a division of volunteers in the Spanish-American War at Santiago, and fought with distinction in the attack on El Caney, July 1, 1898. He was then ordered to the Philippines as second in command to General Otis, and there rendered conspicuous service, fighting more than twenty battles. During the Battle of San Mateo, while riding on a white horse at the head of his troops, he fell, mortally wounded.

LAZ'ARUS, the brother of Mary and Martha of Bethany, the youngest member of the family that Jesus loved (*John* XI, 1-44). At Jesus' call, "Lazarus, come forth," he rose and came out of the tomb after having been dead four days. Tennyson, in *In Memoriam,* has this stanza concerning Lazarus of Bethany:

> Where wert thou, brother, those four days?
> There lives no echo of reply,
> Which, telling what it is to die,
> Had surely added praise to praise.

Lazarus is also the name of the beggar in the parable of the Rich Man and Lazarus (*Luke* XVI, 19-31). This is the only instance in which a proper name is given to a character in a gospel parable.

LEA'COCK, STEPHEN BUTLER (1869-), a Canadian educator and author, whose literary work has been done in two distinct fields. At first Professor Leacock was known as an economist and historian, but more recently he has reached a new and wider public as the writer of delightful, humorous sketches. Many of these sketches have appeared in periodicals and have later been collected and issued in volumes. Among these volumes are *Literary Lapses; Sunshine Sketches of a Little Town; Nonsense Novels; Behind the Beyond;* and *Arcadian Adventures with the Idle Rich.* Of his more serious literary efforts the best known are *Elements of Political Science,* and the biographies of Baldwin, Lafontaine and Hincks in the *Makers of Canada* series.

Professor Leacock was born in England, at Swanmoor, Hants, but went to Canada as a boy. He was educated at Upper Canada College and at the University of Toronto. He also took a postgraduate course in political science at the University of Chicago, from which he received the degree of Doctor of Philosophy. Since 1891 he has been a teacher, and for many years has been head of the department of economics and political science in McGill University.

LEAD, *led,* a soft metal, used principally in the manufacture of lead pipe and white lead. It is of a bluish-gray color and so soft that it can be scratched with the finger nail. Lead is eleven and one-third times heavier than water; from this we can readily understand how the expression "heavy as lead" originated. It is well to remember, however, that many substances are heavier than lead. When cut, lead presents a bright, metallic surface, almost as white as silver, but it soon turns dull because of the combination of oxygen of the air with it. It melts at a temperature of 620° F., a

WORLD PRODUCTION OF LEAD

The six countries which lead in lead mining. The statistics apply to the year 1914, prior to the outbreak of the War of the Nations.

temperature above the melting point of tin but below that of zinc, but when it cools it contracts, so it cannot be used for making castings or anything requiring careful measurements.

Lead is found in many localities, in veins and also in masses. The process of mining is simple, since the ore is readily separated from the enclosing rock when broken into small fragments. Its chief source of supply is the ore *galena,* which is a compound of lead and sulphur. It occurs in cubelike crystals with a gray metallic luster. Another ore, a compound of lead and carbonic acid, contains silver and copper, and all three metals have to be considered in treating this ore (see METALLURGY). Lead is obtained from galena by roasting the ore with iron, when the sulphur combines with the iron and sets the lead free.

While its chief use is in the manufacture of lead pipes, it is also employed for lining tanks and tea chests and in making numerous alloys, such as solder, which is lead and tin; shot and type metal, composed of lead and antimony; and pewter, a combination of lead and zinc. A number of compounds of lead are important in the arts. *Lead acetate,* or *sugar of lead,* is used in dyeing; carbonate of lead, or *white lead* (which see), is the basis of the best

paints; *red lead,* a compound of lead and oxygen, is also used as a paint; *litharge,* another *oxide of lead,* is used in making plate glass and glass for lenses. Lead chromate is used as a pigment under the name of *chrome yellow.* It is of interest to note that although white lead and red lead are lead compounds, *black lead* is not lead at all, but a form of carbon (which see).

The United States produces more lead than any other country. The leading states, in the order of their production, are Missouri, Idaho, Utah and Colorado. Canada is rapidly developing a lead industry of importance, and, to

PRINCIPAL UNITED STATES SOURCES

encourage the operation of silver-lead smelters, the government pays a bounty of fifty cents per ton on all the lead produced. The annual output is about 20,000 short tons.

Lead Tree. If a rod of zinc is suspended in a solution of lead acetate, lead will precipitate on it in branching crystals, forming what is fancifully called a *lead tree.* J.F.S.

Consult Kemp's *Ore Deposits of the United States and Canada;* Hoffman's *Metallurgy of Lead.*

LEAD, *leed,* S. D., a city famous for its gold mines, which are among the largest in the world. It is situated in Lawrence County, about midway between the northern and southern borders of the state, and thirty miles east of the Wyoming state line. Pierre, the capital, is 250 miles east. The Chicago, Burlington & Quincy and the Chicago & North Western railways serve the city. Lead was settled in 1877; it was incorporated as a city in 1890, and it adopted the commission form of government in 1912. The word *Lead* is a miner's term, which denotes the discovery of a lode. About thirty-five per cent of the population is comprised of English, Italians, Austrians and Finns. Population, 8,392 in 1910; it had increased to 9,763 by 1916 (Federal estimate).

By the single industry of gold mining, Lead has been converted from a vast mining camp into a modern mining city, with well-lighted, well-paved streets and handsome buildings. Its setting is in the heart of the Black Hills, in the midst of some of the wildest scenery of the West. Such an abundance of pure sparkling water is furnished by the mountain streams that it is available for public and for private use. Here is located one mining company employing over 2,200 men; about 5,500 are employed by the other mining companies. The city has a Federal building, constructed in 1910 at a cost of $90,000; a high school in which domestic science, domestic art, business and technical courses are provided; the Hearst Free Library, the gift of Mrs. Phoebe Hearst; a business school, and a kindergarten. An institution worthy of mention is the Recreation building, which contains an auditorium, a gymnasium, a swimming pool, bowling alleys and billiard rooms; it was erected by one of the mining companies for its employees and cost a quarter of a million dollars. Besides the mining industry, the city has machine shops, mining-tool works and one of the most extensive cyanide plants in the world. E.C.T.

LEAD, Sounding, upon which sailors once depended for determining the depth of water, is a tapered leaden cylinder attached to a *lead-line* of rope or wire. Since shores and harbors have been charted, and instruments have been invented which will accurately measure depths from ships in motion, the lead is seldom employed in navigation, though still used in explorations of shallow waters (see Sounding). The underside of a lead is hollow and contains tallow, that it may bring up ooze or mud to prove that it has touched the sea bottom. The hand lead, for use in less than twenty fathoms (120 feet) of water, weighs from five to fourteen pounds.

LEAD POISONING, a serious disease caused by lead entering the system. It usually affects painters and persons employed in white-lead factories. The most common result is lead colic, or painter's colic. The trouble may also attack other persons who drink water which has passed through new lead pipes; from eating candy which has been colored with chromate, chloride or carbonate of lead; or by living in rooms which have been freshly painted with lead colors. Sometimes it results in kidney disease, muscular palsy, epilepsy or serious brain trouble. Lead poisoning is first detected by a change of color in the countenance of the sufferer, which turns to a sallow, earthy hue. The skin becomes dry and harsh; the digestion becomes disordered, and a sweetish, metallic taste is felt in the mouth. The margin of the gums turns blue or violet, due to the formation of a sulphite of lead.

LEAF INSECT, an East Indian insect, remarkable for its resemblance to a green leaf, and for this reason sometimes called *walking leaf*. It is bright green in color, and measures about three inches in length. Its foliagelike appearance is due both to the broad, ribbed wings and to the leaflike expansions at the joints of the legs. Even the eggs bear a curious similarity to the seeds of plants. Leaf insects are found under wood or shrubs, where on account of their form and color, they are not readily discovered. They feed upon leaves at night, and are usually quiet during the day. Other species found in Eastern countries and on the islands of the Indian Ocean are yellow or brown in color and look much like withered leaves. Certain wingless species resemble slender twigs.

LEAGUE, *leeg,* a measure of length of ancient origin. The Romans derived it from the Gauls and computed it as equivalent to 1,500 Roman paces, or 1.376 modern English miles. The league was introduced into England by the Normans, probably in 1066, and it then equaled two English miles of the period, or 2.9 modern English miles. At the present time it is a marine measure, equivalent to three geographical miles, or 3.456 statute miles. The same marine league is in use in other countries. Prior to the introduction of the metric system the French applied the term to two land measures, the legal posting-league, or 2.42 English miles, and the league of twenty-five to the degree, or 2.76 statute English miles.

LEAGUE TO ENFORCE PEACE, a society formed at a conference held in Philadelphia's Independence Hall, on June 17, 1915, the object of which is "to secure the maintenance of peace after the close of the war in Europe, by the use of economic and military force." The proposals of the League represent the efforts of a large body of public-spirited men and women to provide a satisfactory remedy for the conditions which made possible the deplorable European conflict. After a series of preliminary conferences the project was formally launched at the meeting in Philadelphia, where a number of articles setting forth the principles of the organization were presented and adopted. William Howard Taft was elected president, and Alton B. Parker vice-president; on the membership list of the League were names of hundreds of the foremost of America's citizens.

The underlying principle of the organization was stated by its president, Mr. Taft:

> The central basis of the plan which we respectfully recommend to the authorities who shall represent our government in any world conference that will necessarily follow the peace, is that the Great Powers of the world be invited to form a League of Peace, which shall embody in the covenant that binds its members the principle that every member of that League has a right to be consulted before war shall be perpetrated between any two members of the League; or to put it another way, that the whole League shall use its entire power to require any member of the League that wishes to fight any other member of the League, to submit the issue upon which that member desires to go to war to a machinery for its peaceful settlement before it does go to war.

The first annual assemblage, held in Washington, D. C., May 26-27, 1916, was attended by over 2,000 delegates, representing not only every state in the Union, but also Alaska, Hawaii and Porto Rico. In less than a year thereafter the United States entered the War of the Nations as a belligerent, on the side of the entente allies, and the League in part suspended its activities until the immediate results of the great struggle could be determined. Its officers expected the organization to be influential in framing the terms of peace.

LEAMINGTON, *lem'ing tun,* a town in Essex County, Ontario. It is situated on Lake Erie, and is the southernmost town in Canada. Windsor is thirty miles northwest. Railway transportation is provided by the Michigan Central and Pere Marquette railways, and an electric line extends to Windsor; steamers communicate with Pelee Island, on the south. Leamington is located in a district rich in agricultural products, especially in corn, tobacco, small fruits and vegetables. Large capital is invested in the tobacco industry in this locality, and the largest early vegetable hothouse in Ontario is located here. The leading manufactories make baskets, handles, cigars, foundry, machine shop and planing-mill products. Natural gas and oil are found in the vicinity. Leamington is an attractive town with fine, shady streets and handsome residences. Sea Cliff Park, a delightful outing place on the coast, is owned by the town. The population in 1911 was 2,652; it was estimated at 2,750 in 1916.

LEAN'DER. See HERO.

LEAP YEAR, a year which has 366 days, or one day more than an ordinary year. The extra day is added to the month of February. The origin of the name is unknown, but it probably arose from the fact that any date in a leap year after the added day of February

20 "leaps" over the day of the week on which it would fall in ordinary years. For example: if March 1 falls on Monday in one year it will fall on Tuesday in the next, if that is an ordinary year of 365 days, but on Wednesday if it is leap year. Leap years are those which may be exactly divided by four, except that years ending with two ciphers are leap years only when they are divisible by 400. See CALENDAR.

LEASE, *leese,* a contract or conveyance for the possession and profits of land or other property for a stated period. The party granting the lease is called the *lessor;* the party to whom it is granted is the *lessee,* or *tenant;* the fixed compensation received in return for the use, possession and profit of the property is called the *rent.* A lease for life terminates with the death of the lessee, while a lease for a term of years begins and ends at a certain specified date. Under a lease for a long period the tenant possesses greater privileges, as he becomes the virtual owner of the premises and is limited only by rules that govern the relations of landlord and tenant. Rents may be payable in valuables other than money, such as produce, but this is unusual; indeed, frequently the terms of a lease specify that the rental shall be payable in gold, to guard against possibility of having to accept a depreciated currency, which would lower the income derived from the property. The essential specifications in a written lease are dates, names, rent and description of property. A lease for a period of from one year or less may be by verbal contract, but it must be in writing if for a longer period. See CONTRACT; TENANT.

LEAST COMMON MULTIPLE, the least number that will contain two or more numbers without a remainder.

What number of pennies can be divided exactly into groups of two pennies each or groups

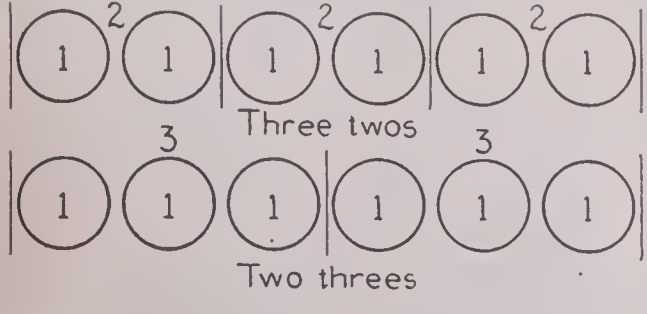


FIG. 1

of three pennies each? We can divide 6, 12, 18, 24 and so on into groups of 2's or groups of 3's, as three twos, two threes (see Fig. 1).

By a drawing show how 12 units and 18 units can be divided into groups.

What number of yards of ribbon can be divided exactly into 2-yard strips or 5-yard strips (see Fig. 2)? Into strips of 10 yards, 20 yards, 30 yards and so on?

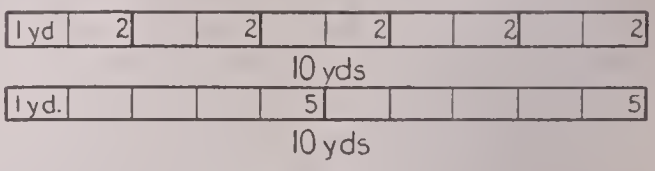


FIG. 2

Show the same for 20, 30 and 40, by drawings.

6, 12, 18, etc., are multiples of 3 and 2. 10, 20, 30, etc., are multiples of 2 and 5.

Because these numbers are multiples of two numbers, they are called *common multiples* of the two numbers. Since 6 is the smallest number that is a multiple of 2 and 3, and 10 is the smallest number that is a multiple of 2 and 5, 6 is called the *least common multiple* of 2 and 3, and 10 is called the *least common multiple* of 2 and 5. This term is abbreviated L. C. M.

How to Find a Least Common Multiple.

(a) The L. C. M. of several numbers often may be easily seen, as, of 2, 4, 8; 2, 5, 20; 5, 10, 30: 8 is the L. C. M. of 2, 4, 8; 20 is the L. C. M. of 2, 5, 20; 30 is the L. C. M. of 5, 10, 30.

(b) The L. C. M. is often readily found, as below, by seeing at once the greatest common factor of several numbers.

(1) Find the L. C. M. of 15 and 24.

$$15=5\times3$$
$$24=8\times3$$

The L. C. M.$=8\times5\times3$; that is, 8×15 or 5×24.

(2) Find the L. C. M. of 72 and 64.

$$72=9\times8$$
$$64=8\times8$$

The L. C. M.$=8\times9\times8$.

(3) Find the L. C. M. of 77 and 99.

$$77=7\times11$$
$$99=9\times11$$

The L. C. M.$=9\times7\times11$.

(4) Find the L. C. M. of 72 and 96.

$$72=3\times24$$
$$96=4\times24$$

The L. C. M.$=4\times3\times24$.

(c) The L. C. M. is found by factoring into prime factors.

(1) Find the L. C. M. of 78, 91, 104.

$$78=2\times3\times13$$
$$91=7\times13$$
$$104=2\times2\times2\times13$$

The L. C. M.$=2\times2\times2\times7\times3\times13$.

Note that the "2" in 78 is not used in the L. C. M. because 2 occurs as a factor in 104, which is found in $2\times2\times2\times13$. The factor "7" of 91 must be used and "3" of 78 so that the multiple will contain 7×13 and 3×13. Look for the factors of 78 in the L. C. M. above. You find $2\times3\times13$. Look for the factors of 91. You find 7×13. Look for the factors of 104. You find $2\times2\times2\times13$. Having found the L. C. M. of any set of numbers, always find in it the factors of each number.

(2) Find the L. C. M. of 300, 252 and 540.

$$300=2\times2\times3\times5\times5$$
$$252=2\times2\times3\times3\times7$$
$$540=2\times2\times3\times3\times3\times5$$

The L. C. M.$=2\times2\times3\times3\times3\times5\times7\times5$.

Note that the first six factors are the factors of 540; the factor "7" is the only factor of 252 not in 540, and it must be used so that the L. C. M. will be divisible by 252; a second 5 is the only factor of 300 not in 540 or in 252, and it must be used so that the L. C. M. will be divisible by 300.

Every prime factor of each number must be found in the L. C. M., the greatest number of times it occurs in any of the numbers. Put into its usual form the rule is stated:

The L. C. M. of several numbers is the product of the different prime factors of the numbers, each factor being used the greatest number of times it occurs in any one of the numbers. This is seen in the last problem above: 3 is a factor of 540 three times; 2 is a factor of each of the numbers twice; 5 is a factor of 300 twice. Therefore 3 occurs as a factor in the L. C. M. three times, 2 occurs two times and 5 occurs two times.

This factoring is sometimes done as follows: Find the L. C. M. of 16, 54, 72.

2	16	54	72
2	8	27	36
2	4	27	18
3	2	27	9
3	2	9	3
	2	3	1

The L. C. M.$=2\times2\times2\times3\times3\times2\times3\times1$.

Explanation. Find any prime factor common to two or more of the numbers; divide by this factor the numbers *divisible* by it, placing quotients in the line below, and with them the undivided numbers. Find a second prime factor, and divide and bring down as before. Continue as above until there is no factor common to any two of the resulting numbers. The L. C. M. is the product of all the divisors, quotients and undivided numbers. A.H.

LEATHER, *leth'er,* a commodity of the utmost service to mankind, made of the dressed skins of animals. Savage man used the pelts of wild beasts to protect him from the rigors of winter. Civilized man, for the most part, wears leather only on his hands and feet, but he has found many other invaluable commercial uses for it.

The untreated, dry skins of animals soon rot. Primitive man learned how to prevent this decay by treating hides with smoke, oils and the brains of the animals themselves, later resorting to certain astringent barks. The process of dressing is now much more scientific, skins being prepared for industrial use by tanning, tawing, chamoising, and so on. The hide of the animal consists of three layers, but it is of the true skin, the middle layer of gelatinous fibers, that leather is manufactured.

When the tanner gets his hides they are usually hard and inflexible. If they reach him from a distance, he finds they have been preserved by salting or drying, and are hard and stiff. To restore pliability, the hides are soaked in water, often being subjected also to a kneading process. The hair is then removed with the aid of milk of lime, or one of several acids. The skin is then ready for tanning. This is accomplished by placing it in a vat containing a solution made by soaking ground oak or hemlock bark in boiling water, the strength of the solution being gradually increased. The tanning of large hides requires from four to twelve months by this method, but for all common uses leather is now tanned less slowly by a chemical process. Sheepskins and goatskins are prepared by a process of *tawing,* bran and alum being substituted for tanbark. This produces the pliable leather used for gloves, the uppers of shoes, etc. The soles of shoes are made of the thick parts of horsehide or cowhide, found along the back of the animal. From goatskin various grades of kid and the so-called *Morocco,* used in bookbinding, are obtained.

The leather manufactured in the United States is the best in the world, and it is an important article of export. However, the best skins in the world are grown on sheep in the Caucasus Mountains region of Europe.

Artificial Leather, a term applied to substances which resemble leather and are substituted for it. Leather is a costly commodity, and since the demand for it is great the ingenuity of manufacturers put a substitute on the market in 1849. This was then called *leather cloth.* The process of manufacture is as follows: The cloth is covered with oily pigments, is dried in a hot oven, and after being passed between rollers, is covered with pumice dust.

The pumice dust serves to smooth the surface, which is then coated with enamel paint. Artificial leather is also made of parings of leather, reduced to a pulp, and then shaped in a mold. The commodity known as *vegetable leather* consists of rubber dissolved in naphtha and spread over linen cloth. It is especially stout and durable. A more modern substitute for genuine leather is called by the trade name *pantasote,* and few people are able to detect the real article from this clever and durable imitation. A great number of articles which are claimed to be leather-covered are really incased in imitation leather, and this substitution even extends to seat cushions for carriages and automobiles. G.B.D.

Consult Proctor's *The Making of Leather;* Leland's *Leather Work.*

LEATH'ERBACK, or **LEATHERBACK TURTLE,** also called *trunk-back,* is a sea turtle which is found in limited numbers throughout the tropics in the Atlantic, Pacific and Indian oceans. It is the largest turtle known, and is probably becoming extinct. The name *leatherback* is given to this species on account of the soft, leathery appearance of the brown shell. The animal sometimes wanders into the cooler regions, and is found occasionally on the American coast as far north as Cape Ann. The largest specimens grow to be six feet or more in length, and weigh from 800 to 1,200 pounds. The leatherback feeds on lobsters, crabs, shrimps, jellyfish and other marine prey. Its own flesh is not eaten by man, as it has a disagreeable flavor and is reputed to cause sickness.

Leatherbacks appear in large numbers on the Tortugas Islands off the coast of Florida during the breeding season. Sometimes more than 1,000 turtle eggs are found in one spot, where several females have deposited their eggs together. After they are hatched by the heat of the sun the little turtles seek the water.

LEAVENWORTH, *lev'en wurth,* KAN., the county seat of Leavenworth County, and an important commercial center, situated on the Missouri River on the northeastern border of the state, twenty-six miles northwest of Kansas City. Leavenworth is served by the Atchison, Topeka & Santa Fe, the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Rock Island & Pacific, the Leavenworth & Topeka, the Missouri Pacific and the Union Pacific railways; an electric line connects with Kansas City. The city was founded in 1854, and is the oldest permanent settlement in Kansas. Throughout the antislavery agitation it was an influential proslavery center. In 1855 it became a city and in 1909 the commission form of government was adopted. The population in 1910 was 19,363; the state census of 1915 reported 22,090.

Besides being a distributing point of consequence, Leavenworth has large coal-mining interests; the city is built over almost inexhaustible coal deposits, and a large number of people are employed in the mines. Manufacturing is carried on extensively, the chief establishments being the woolen mills, flour and grist mills, iron foundries, lumber mills, machine shops, and furniture, broom and wagon factories. The most notable buildings are the Cathedral of the Immaculate Conception, Kansas State Orphan Asylum, the Federal building and county courthouse. Mount Saint Mary's Academy and the Whittier Library supplement the public schools.

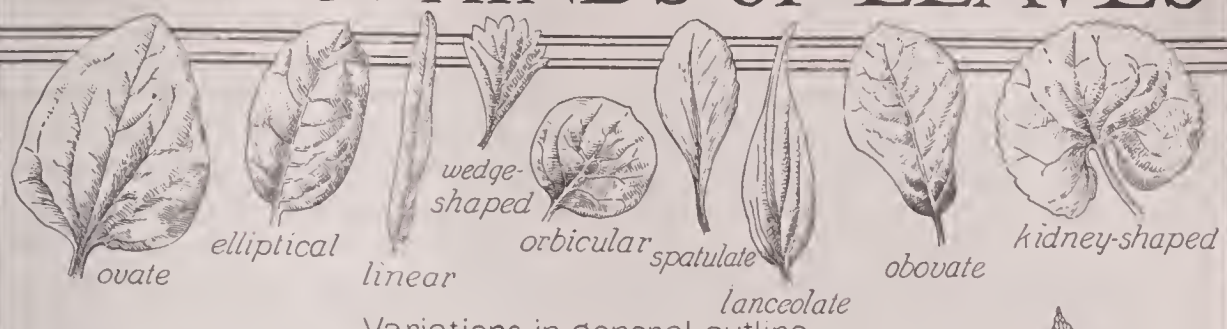
The city received its name from Fort Leavenworth, north of the city, erected in 1827, and one of the most important military posts in the West. It has a noted infantry and cavalry school, a military prison and a national cemetery. An object of especial interest in the city is a mammoth bronze statue of General Ulysses S. Grant.

LEAVES, *leevz,* which clothe the trees in summer with garments of green, and array them in autumn with gorgeous reds and yellows, are among the most useful and important of plant organs. Not without a purpose did Nature fashion them in their bewildering variety and beauty; they were not created merely to be "the green sunshades over our heads," or the "thousand whispering tongues of the forest." The leaf is the builder of the plant; as John Ruskin has said in his *Modern Painters*—

> It leads a life of endurance and effort; it connects itself with the whole previous edifice by one sustaining thread, continuing its appointed piece of work all the way from top to root.

How the Leaf Is Made. As will be shown, the leaf performs its work for the plant by using the sunlight, and it has been constructed so as to absorb as much as possible of that life-giving energy. The typical leaf, therefore, is a thin, flat outgrowth of the stem, expanded, in most cases, horizontally. Its upper and lower surfaces are covered with a thin, colorless membrane called the *epidermis,* or skin, and between these coverings are several layers of cells. The green color of the leaf is due to

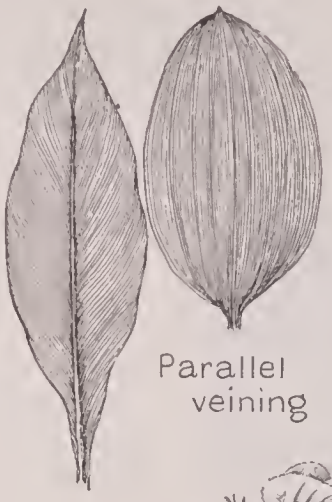
VARIOUS KINDS OF LEAVES



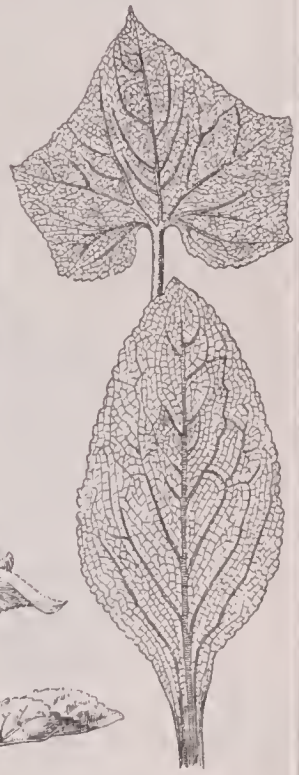
Variations in general outline

a-serrate, or saw-toothed
b-dentate, or toothed
c-crenate, or scalloped
d-repand, undulate, or wavy
e-sinuate
f-incised, cut, or jagged

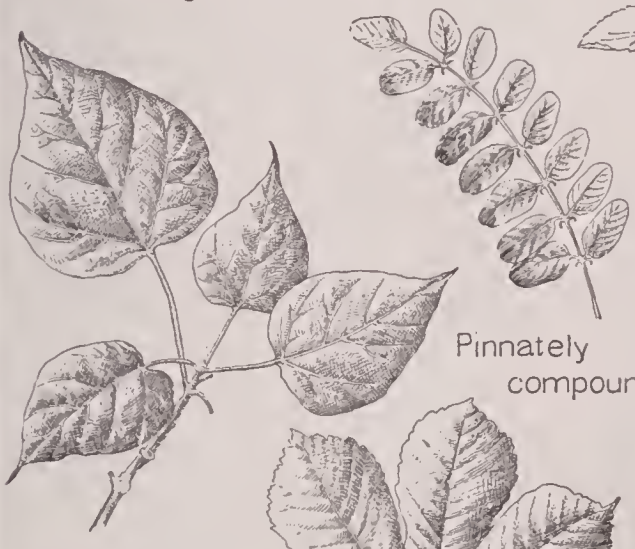
Marginal forms



Parallel veining



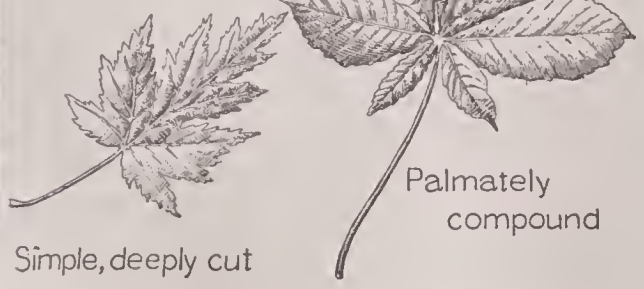
Netted veining



Simple

Pinnately compound

Alternate arrangement



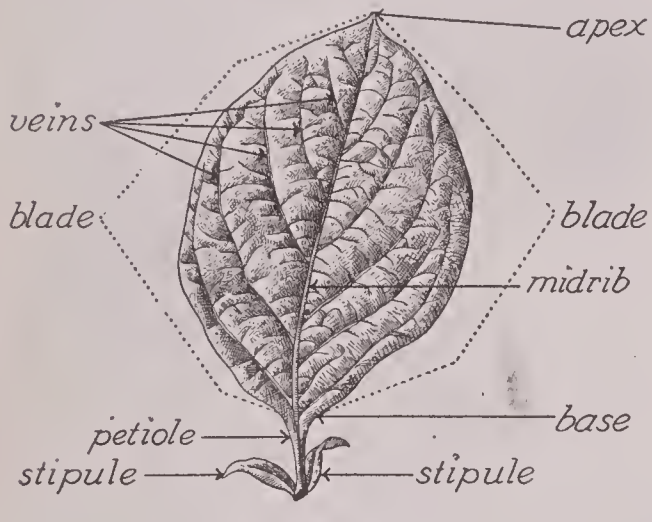
Simple, deeply cut

Palmately compound

Opposite arrangement

a substance called *chlorophyll,* or leaf green, found in certain of the inner cells (see CHLOROPHYLL). Running through the leaf are threads of fiber, forming *ribs* and *veins.* In the epidermis are numerous minute openings *(stomata),* known in popular language as *breathing pores,* because they influence the interchange of air between the outer and inner portions of the leaf. The chief parts of a perfect leaf are the expanded portion, or the *blade,* the leafstalk, called the *petiole,* and two expansions at the base of the petiole, known as *stipules.*

Forms of Leaves. Of all the countless leaves borne by plants year after year, no two are exactly alike, but botanists classify them according to certain prevailing types of formation. Every leaf may be placed in one of two



PARTS OF A LEAF

great divisions, *simple* and *compound,* but there are many varieties of both simple and compound leaves. To the former class belong those whose blades form one continuous piece; to the latter, those leaves which consist of several leaflets, each united to a common stalk, or midrib, by its own stem. Simple leaves are sometimes deeply cut into lobes, as in the case of the oak and maple. Compound leaves are said to be *pinnately* divided when the leaflets are arranged along the sides of the midrib, and *palmately* divided when they radiate from the petiole. The terms *pinnate* and *palmate,* as indicated by the illustration on page 3361, refer to the shape of the leaf; the one is derived from the Latin *pinnatus,* meaning *feathered;* the other, from *palmatus,* meaning *marked with the palm of the hand.*

Ruskin, quoted above, has described, in his picturesque fashion, the wonderful variety of form assumed by the foliage of the plant kingdom.

> Star-shaped, heart-shaped, spear-shaped, arrow-shaped, fretted, fringed, cleft, furrowed, serrated, sinuated, in whorls, in tufts, in spires, in wreaths, endlessly expressive, deceptive, fantastic, never the same from foodstalk to blossom, they seem perpetually to tempt our watchfulness and take delight in outstripping our wonder.

Some of the most familiar forms of the leaf blades and their marginal variations are shown in the picture on page 3361, and leaves also vary greatly in size, ranging from the minute forms of such plants as the arbor vitae to the giant leaves of many water plants and palms. The leaves of the Victoria regia, a plant found on the lakes of Guiana and Brazil, are six feet in diameter, large enough to provide a standing-place for waterfowl while watching for their prey. A Central American palm of the arum family has been known to bear leaves thirteen feet long.

According to the character of their veining, leaves are said to be *netted-veined* and *parallel-veined.* When all the veins of a netted-veined leaf rise from a single rib the leaf is pinnately-veined, and when they run through the blade like the toes of a web-footed bird, the leaf is palmately-veined. Parallel-veined leaves, also, are of two types, those in which the threads run lengthwise through the blade, and those with parallel veins extending from the midrib to the margin (see illustration). The two general types of leaf arrangement on the stem, *opposite* and *alternate,* are also shown in the illustration.

The Work of the Leaf. The most important function of the leaf is the manufacture of sugar and starch for the nourishment of the plant. This is a process which, in some marvelous way not fully understood, takes place through the breaking up of water and carbon dioxide into their elements. Carbon dioxide is absorbed from the air through the openings in the epidermis; inside the leaf cells is also found a supply of raw material, consisting both of carbon dioxide and water. Energy from the sun's rays is absorbed by the chlorophyll (green coloring matter) in the leaf, and this energy is the power which breaks up the raw material into carbon, hydrogen and oxygen. These gases are then united into new compounds, which, after certain chemical changes, become starch and sugar. During the process some of the oxygen passes into the atmosphere. This marvel of plant life can take place only in the sunlight and is characteristic only of plants that contain chlorophyll. It is a function not possessed by plants that

live on others (see PARASITES), or by those, like molds, toadstools and yeast, which live on decaying organic matter.

It is frequently said that the leaves are the lungs of plants. This means that leaves, through their *stomata* (small openings), absorb oxygen and give off carbon dioxide, in the same manner as do animals through their lungs. The amount of oxygen absorbed and of carbon dioxide given off, however, is very small compared with the amount of each gas passing in the opposite direction during the starch-making process. Furthermore, the interchange of gas in the breathing of plants is not the fundamental part of that function. What is of importance is the decomposition of complex substances, and the consequent release of energy. This energy the plant uses to carry on its work. A comparison of the breathing process of plants and animals shows that carbon dioxide, a deadly poison to animals, is essential to the life of plants. Just as animals cannot live without oxygen, so plants would perish without carbon dioxide. Though some oxygen is taken in by the leaves in the process of respiration, it is but a small proportion of the carbon dioxide absorbed by them in starch-making.

A third function of the leaf is that of *transpiration,* or the giving off of water into the air. By experimenting botanists have discovered that surprisingly large amounts of water are given off by various plants through their leaves: 2,250 gallons were transpired in a single summer by a beech tree 110 years old; an oak tree having 700,000 leaves gave off each day about 180 gallons; and during four months of the growing season an acre of cabbages gave off 500,000 gallons. This moisture represents the surplus water of the crude sap which circulates through the tissues of the plant.

In hot, dry weather plants sometimes wilt because they are giving off more water than they are securing from the soil, and the devices they use at such times are interesting examples of adaptation to conditions. The leaves of a corn plant, for instance, often roll up into tubes to keep the plant from wilting, for a curled leaf exposes much less surface to evaporation than one whose blade is fully expanded. Nurserymen keep the branches of young orchard and shade trees well pruned partly to help maintain a balance of the water supply, for if the leaves are permitted to grow too profusely the trees will lose more moisture than they can absorb through their roots.

Why the Leaves Fall. In the tropical regions trees usually keep most of their leaves the year round, and this is true also of such northern evergreens as the pines, spruces, etc. But the greater number of the common forest trees that grow in temperate climes pass through the long winter months without their leafy garments. There are two important reasons for the fall of the leaf. During the cold season, when the ground is near or at the freezing temperature, the roots of a plant are unable to absorb much soil-water, and if the broad-leaved trees retained their foliage the leaves would give off so much water the trees would dry up and die. Furthermore, in countries where there is heavy snowfall, the branches of the trees would become overburdened with snow if the leaves remained on them, and would consequently suffer injury.

Important changes take place in the cells of the leaf before its work is over, for its valuable food materials are absorbed by the branches and roots to be used again the following spring. Across the base of its petiole a layer of cork cells forms, and at the proper time there is a break at this point. Then the leaf falls to the ground, forming, with thousands of its fellows, a protective blanket for the roots of the tree. Even the dead leaves are useful; the rains dissolve out their mineral contents and these help in the fertilizing of the soil. It is a pretty fancy that the gorgeous colors of the "painted autumn leaves" are the work of the frost, but scientists tell us that the leaf turns red or golden because of the chemical changes that take place in its cells as it is reaching the end of its period of activity.

In Decorative Art. Leafage is a favorite form of decoration in wood carving, pottery, ornamental sculpture and architecture. The conventionalized acanthus leaf (see ACANTHUS) is the characteristic decoration of the Corinthian column, one of the classic forms in Greek and Roman architecture (see COLUMN). The vine, olive, laurel and ivy were other popular leaves used in Greek and Roman ornamentation, and the lotus leaf appears frequently in Egyptian art. B.M.W.

LEB'ANON, MOUNTAINS OF, a mountain range of Syria extending for 100 miles parallel to the eastern shore of the Mediterranean Sea, on whose slopes in Bible times flourished the famous "cedars of Lebanon" that King Solomon used in the building of the Temple (see *I Kings,* V). So inseparably is the cedar associated with these mountains that the name

Lebanon, wherever used, suggests this fragrant and beautiful evergreen tree; moreover, the species which clothed the slopes of the Syrian range has become the most widely known of all the cedars (see CEDAR, subhead *Cedars of Lebanon*). The poet Spenser has quaintly expressed, in the following lines, the kinship between tree and mountain:

> High on a hill a goodly Cedar grewe,
> Of wond'rous length and streight proportion,
> That farre abroad her daintie odours threwe:
> 'Mongst all the daughters of proud Libanon,
> Her match in beautie was not anie one.

The name is derived from the Semitic *laban,* meaning *to be white,* and is supposed to refer to the bare, white walls of chalk or limestone that form a striking feature of the entire range. The Mountains of Lebanon extend northward from the River Litany, or Leontes, which empties into the Mediterranean near Tyre, to the stream called Nahr el-Kebir, north of Tripoli. East of this chain, and extending parallel to it, is the range known as Anti-Lebanon, the two being separated by a narrow, fertile valley.

The Lebanon is the loftier of the two ranges, having an average elevation of from 6,000 to 7,000 feet, while the summits of its highest peaks, Dahr el-Kodib, el-Miskiyeh and Jebel Makmal, are over 10,000 feet above the sea. On the barren and desolate slopes only a few groves of the famous cedars may now be seen. A narrow-gauge railway extends over the mountains from Beirut to Damascus.

LEBANON, PA., the county seat of Lebanon County, is situated in a rich iron ore region in the southeastern part of the state. It is sixty-six miles northwest of Philadelphia and twenty-six miles northeast of Harrisburg, and is on the Philadelphia & Reading, the Cornwall & Lebanon and the Cornwall railroads, and on interurban lines. The population, which in 1910 was 19,240, in 1916 had increased to 20,779 (Federal estimate).

The city is in the fertile Lebanon Valley, between the Blue and South mountains. Iron ore from the Cornwall mines, five miles distant, and limestone and brick clay taken from the near-by hills give rise to the principal industries of the city. These include furnaces and foundries, rolling-mills, steel plants, extensive nut and bolt works, iron and steel plants, machine shops and brick-making plants. There are also shoe factories, silk, knitting and textile mills, and a creamery.

Lebanon contains a Federal building, courthouse, city hall, armory, Y. M. C. A. building, public library and hospitals, and in addition to the public schools a business college and school of telegraphy.

German emigrants settled at Lebanon in 1700. The borough, platted by George Steitz in 1750, was first called Steitztown. It was incorporated as a borough in 1820 and chartered as a city in 1885. The commission form of government was adopted in 1913. F.W.T.

LECKY, *lek'i,* WILLIAM EDWARD HARTPOLE (1838-1903), an historical writer, whose works rank among the most interesting and valuable literary products of his time. His *History of the Rise and Influence of the Spirit of Rationalism in Europe,* published in 1865, attracted a great deal of attention, and has done more than any other of his works to perpetuate his fame. His *History of European Morals from Augustus to Charlemagne* appeared in 1869. More than one-third of the first volume is devoted to a discussion of the intuitive character of morality. His essay on the *Conversion of Rome* was the subject of much scholarly and theological debate and helped to make the book a subject of wide popular interest. In 1878 he published the first two volumes of a *History of England in the Eighteenth Century;* six more volumes, completing the work, were published within the next ten years. In 1891 Lecky published a volume of poems, and in 1896 a two-volume work, *Democracy and Liberty.* He was a native of Ireland, and received his education at Trinity College, Dublin. He represented the University of Dublin in Parliament, and later was honored with membership in the Privy Council, from which he resigned in 1902.

LECOMP'TON CONSTITUTION, in United States history, a constitution adopted by a convention held at Lecompton, Kan., in 1857, when the antislavery struggle was at its height. According to this constitution, slavery was to be legalized in Kansas, the legislature could not pass any act of emancipation, and the constitution itself could not be amended for seven years. The people were allowed to vote only upon the question whether they would have the "constitution with slavery" or the "constitution with no slavery," and as most of the free-state men declined to vote in the election, the "constitution with slavery" was adopted. In January, 1858, in an election held under the auspices of the free-state legislature, the instrument was rejected. Congress having ordered another vote on the question before Kansas should be admitted to statehood, the

Lecompton Constitution was again rejected in August, 1858, and in the following year an anti-slavery constitution was adopted. See KANSAS, subhead *History*.

LE CONTE, *le kont'*, JOSEPH (1823-1901), an American scientist and teacher, known in two hemispheres for his work in popularizing geology. He was born in Liberty County, Georgia, became the pupil of Agassiz in 1850 at Harvard University, and accompanied him on a scientific expedition to Florida. His most active scientific career began in 1868, when he was called to the University of California as professor of geology. He made contributions to geology and zoölogy, and wrote a great many papers and books on the theory of evolution and the relations of science to religion. Among his works are *Religion and Science; Elements of Geology; Compend of Geology; Evolution: Its Nature, Its Evidence and Its Relation to Religious Thought*.

LEE, CHARLES (1731-1782), an American military officer whose inglorious record during the Revolutionary War culminated in his dismissal from the service, following his court-martial for misconduct at the Battle of Monmouth (see MONMOUTH, BATTLE OF). He was born in England and served in the British army before he joined the colonial forces, being one of Braddock's officers in the disastrous expedition against Fort Duquesne (which see). Two years before the opening of the Revolution he emigrated to America, joined with the patriots in their struggle against Britain, and in 1775 was appointed senior major-general, next in rank to Washington. The following year, while in command of the Southern Department, he was given credit for the brilliant defense of Charleston, S. C., though the honors fell properly to William Moultrie (which see).

From this time on Lee was a hindrance, rather than an aid, to Washington. By refusing to attack the left wing of the British, at the Battle of Monmouth (1778), as commanded by his superior officer, he almost caused the utter rout of the Americans, Washington's timely arrival being the only thing that saved the day. Court-martialed for disobedience, he was suspended from his command for a year, and soon after was dismissed from the army for writing a disrespectful letter to Congress.

LEE, HENRY (1756-1818), an American soldier and statesman of the Revolutionary period, whose activity in scouting and outpost duty won him the name of LIGHT-HORSE HARRY. He also was the originator of the well-known phrase, "First in war, first in peace, first in the hearts of his countrymen," spoken by him in a funeral oration delivered before Congress after the death of Washington.

Henry Lee, who belonged to the famous Lee family of Virginia, was graduated from Princeton College two years before the colonies and the mother country began hostilities, and soon after the outbreak of the war he offered his services in behalf of the American cause. For three years after 1777 he was one of the most efficient scouts in the army, and in 1779 figured in a daring exploit, the surprise and capture of the British post at Paulus Hook, that won him the thanks of Congress. In 1780, having attained the rank of lieutenant-colonel, he led his band of cavalry troops, the famous "Lee's Legion," into the South. There his horsemen formed the rear guard of the American forces during General Greene's retreat through the Carolinas, and highly distinguished themselves at the Battle of Eutaw Springs.

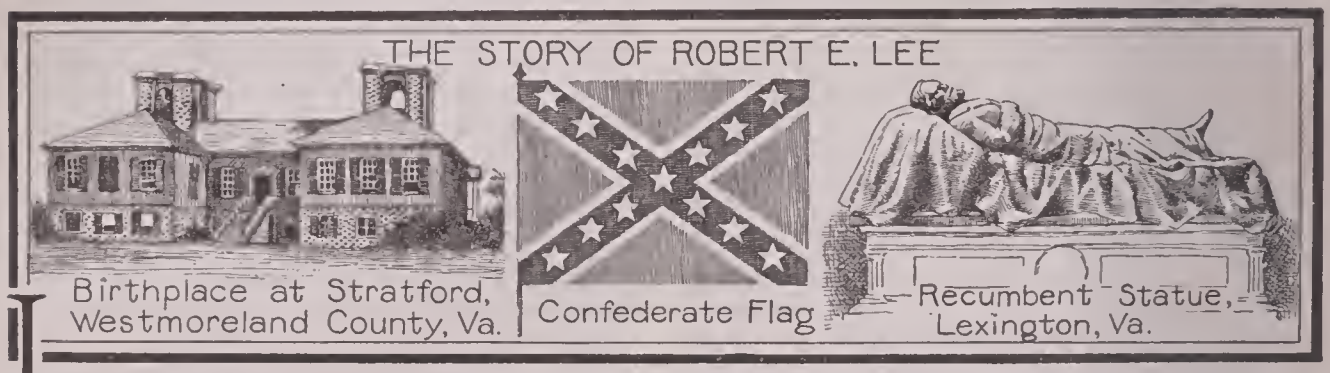
After the war Lee turned his attention to politics. He was a delegate to the Continental Congress and to the Virginia convention which ratified the Federal Constitution, served as governor of Virginia from 1792 until 1795, and while holding the latter position took charge of the troops sent by President Washington in 1794 to crush the Whisky Insurrection (which see). In 1799 he entered Congress, retiring to private life in 1801. Shortly after the outbreak of the War of 1812 he was appointed major-general, but before he could resume his military duties he received a severe wound while helping to quell a political riot in Baltimore. From the effects of this injury he never recovered.

RICHARD HENRY LEE

LEE, RICHARD HENRY (1732-1794), a statesman and patriot of the Colonial and Revolutionary period, who won fame as the author of the resolution which led to the adoption of the Declaration of Independence (which see). He was born at Stratford, Va., and was educated in England. From the beginning of the struggle against Great Britain he was actively in sym-

pathy with the colonists, and was a recognized leader in the first Continental Congress, assembled at Philadelphia in 1774, in which he sat as a delegate from Virginia. He prepared such able addresses to the king, the people of England and the colonies that the Earl of Chatham (William Pitt) declared that "for solidity of reasoning, force of sagacity and wisdom of conclusion, under such complication of circumstances, no nation or body of men could stand in preference to the general Congress at Philadelphia."

The most celebrated of all Lee's speeches was made on June 7, 1776, when he introduced before the Congress at Philadelphia the celebrated motion that "these united colonies are, and of right ought to be, free and independent states, absolved from all allegiance to the British Crown." In 1784 he became president of Congress, and was elected to the Senate for Virginia after the Federal Constitution was adopted. In 1792 he retired from public life because of ill health. His oratorical powers were remarkable.



LEE, ROBERT EDWARD (1807-1870). All critics agree that Robert E. Lee, commander-in-chief of the armies of the Confederacy, was one of the greatest generals the United States has ever produced; many believe him to have been the greatest. But so beautiful was his personal character that the fame which has grown steadily since his death has taken as much notice of that as of his military achievements in the face of the most heartbreaking difficulties. "Ideal soldier" he was, but "perfect man" no less, one writer has declared; and the North against which he fought with all the energy of his nature now holds him in as loving remembrance as does the South which he served.

Early Life. "When should the education of a child begin?" someone once asked Oliver Wendell Holmes. "Two hundred and fifty years before he is born," was the instant reply; and the life of Lee is perhaps the best example in all American history of what beginning a man's education two hundred and fifty years before he is born can do for him. His family, in England and later in the colony of Virginia, was illustrious in peace and in war, the names of Francis Lightfoot, Richard Henry and Henry Lee standing out prominently in colonial and Revolutionary history. The last-named, the famous cavalry leader best known as "Light-Horse Harry," was the father of Robert E. Lee, who was born on January 19, 1807, at Stratford, Westmoreland County, Virginia. He grew up with a passionate devotion to his native state, which was then the leader among all the states, and that devotion he showed to the end of his life.

Sent in 1825 to the military academy at West Point, he passed his four years there without receiving a demerit or even a reprimand, and was graduated second in his class. Two years later, on June 30, 1831, he married Mary Parke Custis, the great-granddaughter of Washington's wife, and toward her he showed all his life a most beautiful devotion. In 1834 he became assistant to the chief engineer of the army at Washington, and later superintended the construction of defensive works in New York harbor.

From the Mexican War to the War of Secession. During the Mexican War his services were so brilliant that he not only attained the brevet rank of colonel (see BREVET), but received the fullest commendation from General Scott, who is reported to have declared that his "success in Mexico was largely due to the skill, valor and undaunted courage of Robert E. Lee, * * * * the greatest military genius in America." After spending three years at engineering work in Baltimore, Lee became, in 1852, superintendent at West Point, and in his three years' term left a decided impress upon the institution. Made lieutenant of cavalry in 1855, he spent the greater part of the

next six years in Texas, away from his beloved Arlington, but happened to be at home in 1859 at the time of John Brown's raid, and was placed in command of the troops sent to suppress it. This accomplished, he returned to his regiment and there remained until 1861, when Texas seceded, and he was summoned home.

Lee was opposed to the breaking up of the Union; he felt that slavery was an even "greater evil to the white than to the colored race;" and he had several years before freed the few negroes which he had inherited; but loyalty to his state made him refuse the command of the United States army when it was offered him in April, 1861, and he accepted the leadership of the army of Virginia. It caused him the greatest grief to part from his companions in arms, for he had always felt "that the cordiality and friendship in the army was the great attraction of the service," and the break with General Scott, his commander-in-chief, was particularly hard. Appreciating his military genius, President Jefferson Davis very

ROBERT E. LEE

shortly raised him to the highest rank in the Confederate army.

The Great Struggle. For a time Lee had no army under his command, but remained with President Davis as his military adviser and thus had no active part in the first Battle of Manassas, though his plans were in large part responsible for its success. Later in the summer of 1861 he took the field, but not for almost a year was he engaged in any movements of primary importance. Then, in June, 1862, he took command of the Confederate armies in the Peninsula, and in a series of sharp engagements in the neighborhood of Richmond drove the Federals from the Confederate capital.

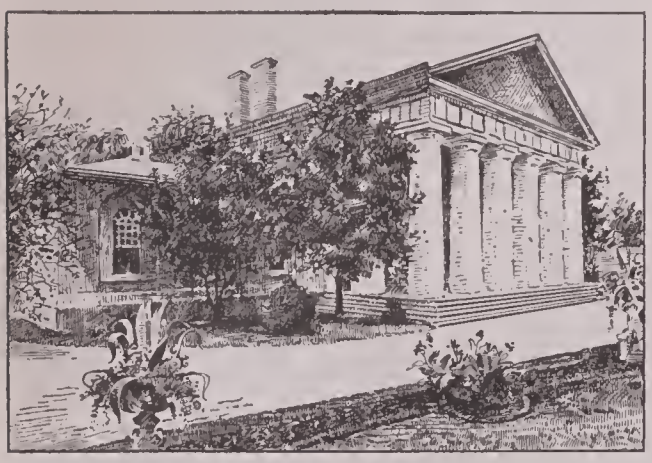
Afterwards he turned his attention from McClellan toward Pope, who commanded the Federal army in Western Virginia, and on August 29 and 30 he and "Stonewall" Jackson won a decisive victory over Pope—the second Confederate victory of Manassas, or Bull Run. Assuming the offensive, Lee next crossed into Maryland with the intention of threatening Washington, but his army was checked at Antietam, and he was compelled to retreat across the Potomac (see ANTIETAM, BATTLE OF).

On the Defensive Again. Intrenched at Fredericksburg, Lee awaited the Federal army, which was again being directed against Richmond. Burnside, the Federal commander, attacked on December 13, and Lee's army drove him back with great loss, but Lee was unable to take advantage of his victory because the Federals had been so placed that they could fall back without endangering their line of communication. Lee knew that the Confederate reserves in men and in supplies were shrinking rapidly, and that victories which simply held the enemy's forces but did not destroy them were too costly to be indulged in. Yet another defensive battle had to be fought, and on May 2-4, 1863, at Chancellorsville, Lee won over Hooker one of his most brilliant victories. Lee suffered in this battle an irreparable loss, for Stonewall Jackson, his most efficient aid, was fatally wounded by some Confederate marksmen, who fired upon him by mistake.

A Losing Fight. Determining now on a more aggressive campaign, Lee led his forces into Pennsylvania, and on July 1 began the most famous conflict of the war—the Battle of Gettysburg. In three days of fighting he showed the most distinguished ability and his army the utmost bravery, but they were overborne by the Federals under Meade, and were compelled to retreat across the Potomac. The greatness of Lee's character was as evident in this defeat as in his most brilliant victories, for he insisted on taking upon himself all the blame for the failure of the campaign, just as at Chancellorsville he had given all the credit for the victory to Jackson.

After a hard winter, Lee's forces found themselves in the spring of 1864 called upon to face a new Federal leader—the determined General

Grant; and during May and the early part of June there occurred in the "Wilderness" a series of the fiercest and bloodiest engagements of the war. The Federals lost more men than the Confederates, but they had greater reserves and more abundant supplies. Later, during the protracted siege of Petersburg, this costly warfare continued, Lee being unable at any time to gain a permanent advantage, not because of inferior



ARLINGTON

The mansion on the heights above the Potomac River, overlooking the city of Washington. It was for many years the home of Lee, but was taken by Federal troops during the War of Secession.

numbers. Finally, abandoning Petersburg and Richmond, Lee retreated, and at Appomattox Court House on April 9, 1865, surrendered to General Grant. Never, throughout the struggle, were his dignity and true greatness more evident than in the way he met this final failure of the cause for which he had striven; the generous Grant did all in his power to spare Lee humiliation.

Attitude of Lee's Soldiers. Never was a commander more devotedly loved by his soldiers, and never with greater reason; their loyalty was shown most strikingly in this hardest hour of his life. Says a recent biographer:

> When Lee returned to his own lines, he was received with a shout of welcome, which died into a sad silence when his recent mission was recalled. With head bare and tears flowing down his cheeks, he said, "Soldiers, we have fought through the war together. I have done the best for you I could." The men crowded about him. Many wept; while hundreds attempted to take his hand or touch his person or even his horse—

that famous horse, "Traveler," which had been his companion throughout the war and which he looked upon as a real friend.

MONUMENT AT RICHMOND

Last Years. For the first time in forty years Lee was then a private citizen, but his services to his country were not over; for his dignified, manly acceptance of the state of affairs did more than all the Federal garrisons to bring the Southern people everywhere to a like point of view. He refused to accept any office in his own state, fearing that his appearance might inflame sectional bitterness, and he did all in his power to spread a kindly feeling toward the North—a feeling none too natural at that time because of the character of most of the Northerners then active in the South.

On August 5, 1865, Lee was offered the presidency of Washington College, at Lexington, Va., now Washington and Lee University. After considering the proposition several days, he accepted the offer as he himself declared, to "educate Southern youth into a spirit of loyalty to the new conditions." He was inaugurated October 2, 1865. The institution grew under his guidance, and he was as popular with the students as he had been with his soldiers, no student being tolerated by his fellows if he refused obedience to any of the president's requests.

But his services there were brief, for his health failed early in 1870, and a visit in the South failed to bring him any lasting relief. He died on October 12, 1870, after a brief illness, his mind dwelling at the last on his military experiences; for he exclaimed, shortly before the end, "Strike the tent," and then "Tell Hill he must come up." His body was laid in the College Chapel at Lexington, and a Virginia sculptor, Valentine, carved the reclining statue which marks the spot. Not only in the South, but throughout the country, his death was felt as a personal loss. In the words of the distinguished English soldier, Lord Wolseley, there is perhaps as true a picture of him as may be found:

> I have met many of the great men of my time, but Lee alone impressed me with the feeling that I was in the presence of a man who was cast in a grander mould and made of different and finer metal than all other men. He is stamped upon my memory as a being apart and superior to all others in every way—a man with whom none I ever knew and very few of whom I have read were worthy to be classed. E.C.B.

Consult Fitzhugh Lee's *Life of General Lee;* Williamson's *Life of Robert E. Lee;* A. A. Long's *Memoirs of Robert E. Lee;* R. A. Brock's *General Robert E. Lee;* J.

Lee's Birthday

SUGGESTIVE PROGRAMS

I

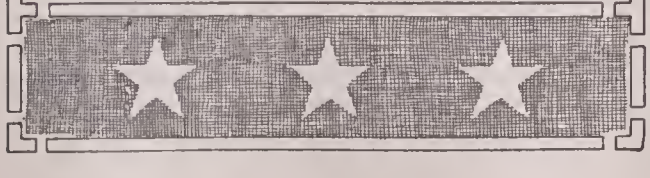
The better rule is to judge our adversaries from their standpoint, not from ours. *Lee.*

Star Spangled Banner
Essay, *Lee's Preparation for His Greatest Work*
The Land Where We Were Dreaming .....*Lucas*
Essay, *Lee's Serviees to the Confederacy*
Marse Robert's Asleep.....*Valentine*
The Sword of Lee.....*Father Ryan*
Lee's Farewell Address to His Soldiers
The Blue and the Gray.....*Finch*
Essay, *The Years After the War*
The Better Way.....*Coolidge*
Confederate memory gems
Dixie

II

Remember! we are one country now. Dismiss from your minds all sectional feeling and bring up your children to be, above all, Americans. *Lee.*

How Firm a Foundation
(Lee's favorite hymn)
Tributes to Lee
Nobility.....*Aliee Cary*
Essay, *Lee's Aneestors*
The Mareh of the Deathless Dead..
.....*Father Ryan*
The Nineteenth of January
Essay, *The Battle of Chaneellorsville*
The Conquered Banner...*Father Ryan*
Essay, *Why the North Loves Lee*
After Appomattox
Tenting on the Old Camp Ground



W. Jones's *Personal Reminiscences of Robert E. Lee; Recollections and Letters of Robert E. Lee.*

LEECH, a large division of ringed worms, known also as *bloodsuckers* because of their characteristic habit of sucking the blood of other animals. These worms live for the most part in fresh water, but some inhabit moist, grassy places and others dwell in the sea. They have smooth, segmented bodies, from two to ten pairs of eyes, and digestive and nervous systems of a low order of development. Their sucking organs are two disks, one at each extremity of the body. The best-known leech is the one used for medical purposes, which was considered indispensable in the days when physicians practiced blood-letting to cure almost every ailment. This leech has a mouth in the middle of the front sucking disk, provided with three small white teeth. With these sharp, sawlike projections the worm makes a wound which permits a large flow of blood. Though blood-letting is little practiced at the present time, medical leeches are still imported from Europe into the United States.

LEECHES
Their length is from one-half inch to three or four inches.

LEEDS, *leedz,* a great manufacturing metropolis of England, the fifth town in the kingdom in point of population, situated on the River Aire, twenty-one miles southwest of York. The woolen trade carried on here and in the surrounding towns and villages, especially the ready-made clothing industry, is the most extensive in England, while the iron trade, the manufacture of leather and the making of boots and shoes are almost as important as its woolen activities. General goods to the annual value of over $55,000,000 pass through the warehouses of Leeds every year in normal times. The iron trade in all its branches, including the casting of metal, the manufacture of steam engines, of steam plows and machinery of all kinds, and of mechanical tools, gives employment to more people in Leeds than any other branch of its numerous industries. The tanning establishments, erected on the outskirts, and the boot and shoe workshops are among the largest in the kingdom.

Leeds has always been distinguished for the activity of its political and public life; it has taken a leading part in all the great questions

which have agitated the nation in the present century. The appearance of the town has been greatly improved in recent years. Among the most notable of the newer buildings are the town hall, adorned with portraits and statues of local celebrities; the Royal Exchange; Mechanics' Institute, Central Free Library, and the University of Leeds. Kirkstall Abbey is a fine ruin. Population in 1911, 445,568.

LEEK, a hardy plant belonging to the lily family, with a strong odor somewhat like that of the onion. It is cultivated as a vegetable. The lower part of its leaves is much used in soups and stews, especially in French cookery. The wild plant grows in Eastern Europe and adjacent countries of Asia. The peasants of Europe sometimes plant leeks on their cottage roofs, believing them a protection against lightning. The plant is blanched by covering up the stems with earth, as growth proceeds. The leek is the emblem of the Welshmen, worn on Saint David's Day, March 1. Gardeners sometimes plant leeks in neat patterns which resemble paintings from a distance. They add to landscape gardening on account of their trim and compact form. The plant grows to a height of ten or twelve inches, and bears a purplish flower.

THE LEEK

LEEWARD ISLANDS, a British colony in the West Indies divided into five presidencies under one governor, these being Antigua, Saint Kitts, Dominica, Montserrat and the Virgin Islands, with a total population of 127,536, and an area of 700 square miles. The colony has an executive council nominated by the Crown and a legislative council of twenty, ten nominated and ten elected. The legislative council meets once a year at Saint John, Antigua. The name was applied to this portion of the West Indies from the fact that they are less exposed to the prevailing trade winds than are the groups of adjacent islands. See WINDWARD ISLANDS.

LEGACY, *leg'a si,* a gift of property, especially personal property, by will. The law usually provides that the debts of a deceased man must be paid before legacies can be considered. Gifts of particular objects *(specific legacies)* rank next after debts are paid. If the remainder of the estate is not sufficient to pay the *general legacies,* they are reduced in proportion to their amount.

LE GALLIENNE, *le gal i en',* RICHARD (1866-), a poet, critic, essayist and lecturer, born in Liverpool, England, but since 1898 a resident of the United States. After seven years of business life, following his graduation from Liverpool College, he turned to a literary career, serving for a brief time as private secretary to the actor, Wilson Barrett. In 1891 he became literary critic of the London *Star,* later joining the staffs of the *Daily Chronicle* and the *Speaker.* As the result of a spirited discussion between Le Gallienne and Robert Buchanan on the question, *Is Christianity Played Out?,* the former wrote and published *The Religion of a Literary Man.* After making a lecture tour of the United States and Canada in 1898 he settled permanently in New York. Le Gallienne is the author of much light, graceful verse, contained in such volumes as *English Poems, Odes from the Divan of Hafiz* and *The Lonely Dancer and Other Poems;* the outbreak of the War of the Nations inspired a book of war verse, *The Silk-Hat Soldier.* Among his imaginative prose essays and sketches are *Prose Fancies, The Quest of the Golden Girl* and *The Life Romantic.*

The following lines from his *April* suggest the quality of his lyrical gift:

April, half-clad in flowers and showers,
Walks, like a blossom, o'er the land;
She smiles at May, and laughing takes
The rain and sunshine hand in hand.

So gay the dancing of her feet,
So like a garden her soft breath,
So sweet the smile upon her face
She charms the very heart of death.

LE'GAL TEN'DER, coin or other money which can lawfully be used for the payment of a debt. All gold coins of the United States are legal tender for both public and private payments when not below the standard weight prescribed by law; when reduced below standard valuation they are legal tender in proportion to their weight. The standard silver dollar of 412½ grains is legal payment without regard to the amount, unless otherwise stipulated in the contract. The so-called trade dollar, of 420 grains, is no longer coined and is

not legal tender; nor is any commemorative coin, such as the issue of the Columbian Exposition, nor any foreign coin. The silver coins of the United States, the half dollars, quarters and dimes, are legal tender for sums not exceeding ten dollars. The minor coins, the five-, three- and two-cent pieces and all pennies may be tendered legally for all amounts not exceeding twenty-five cents. However, it should be stated that the two-cent and three-cent pieces are no longer coined. See MONEY.

Canadian Legal Tender. Under the Dominion Currency Act a legal tender may be made in copper coins up to twenty-five cents, and in Canadian silver coins to the value of ten dollars. Dominion notes and gold coins are legal tender to any amount. The British sovereign is legal tender for four dollars, eighty-six and two-thirds cents, and standard American gold coins are legal tender for their face value. During the War of the Nations notes of all chartered banks were made legal tender for any amount.

Tender, in law, a formal offer to pay a debt, or to perform an obligation, which may be either in money or specific articles. A tender of payment does not cancel the debt, for the debtor is still liable for the payment, but it bars all claim to subsequent damages and puts a stop to all interest and costs after the date of tender. The tender must also be unconditional, and if paid in money must be in currency or coin known as legal tender; if delivery of property is tendered it must conform to the contract.

LEGATE, *leg'ate,* from the Latin *legatus,* meaning *appointed,* is a title now confined to the highest diplomatic representatives of the Pope. The Papal legates were at first merely delegates to different divisions of the Church. Sometimes they possessed very high powers, and with the spread of the temporal power of the Pope they began to figure in national affairs. Legates are now of three grades; in the first are the Pope's special representatives *(legate a latere)*; in the second, permanent representatives at foreign capitals (see NUNCIO); in the third, certain archbishops. The dignity of *legate a latere* is restricted to cardinals.

LEGEND, *lej'end,* in modern usage the term applied to an improbable or traditional narrative handed down from the past. The words *legend* and *myth* are sometimes used interchangeably, but strictly speaking the myth deals with supernatural beings, the legend with mortals. The former, too, is usually spread over a wide area, while the latter is apt to be local in character. Legendary tales are interwoven with the early history of all peoples. The first seven kings of Rome, for instance, about whom numerous traditions cluster, are known in history as the *legendary kings.* The Swiss people treasure the legend of William Tell (see TELL, WILLIAM), who typifies the spirit of resistance against a foreign oppressor. Among the well-known legends of literature is Chaucer's unfinished poem, *A Legend of Good Women;* Washington Irving has used the word in the title of one of his most picturesque stories, *The Legend of Sleepy Hollow,* based on the tradition of the Headless Horseman.

Originally the term was applied to narratives connected with religious belief or worship, such as the *Golden Legend* of Jacobus de Voragine, a Dominican monk of the thirteenth century.

LEGENDRE, *le zhahN'dr',* ADRIEN MARIE (1752-1833), a French mathematician who deserves credit for his connection with the establishment of the metric system of weights and measures. He was born in Toulouse, but it was in Paris that he gained distinction. He occupied the chair of mathematics at the military school; in 1783 he became a member of the Academy of Sciences, and in 1785 was appointed to the Bureau of Longitudes. He contributed extensively to the theory of attraction, and was the inventor of the rule of the "least square of errors," explaining a popular mathematical device. His *Elements of Geometry* is well known in France; in a translated form it passed through many editions, and was once a textbook in American schools and colleges.

LEGERDEMAIN, *lej er de mane',* a word meaning *sleight-of-hand,* as used in the performance of conjuring tricks. See CONJURING.

LEG'HORN, in many respects the least Italian of all Italian cities, ranks next to Genoa and Naples as the busiest seaport in the kingdom. It is the capital of Leghorn, the smallest province of Italy, and is situated on the Mediterranean, about sixty-two miles west of Florence. Leghorn hats, made from the straw of wheat growing in the vicinity, and the beautiful coral ornaments which all people admire, are exported from here, as well as marble, olive oil, boracic acid, silk and wine; the exports average £1,500,000 annually. Shipbuilding, too, is an important industry. Leghorn is a very modern city and is well built. Its northwestern portion is intersected by numerous canals, which gave it the name of the "New Venice."

The most interesting of its public buildings include the Cathedral, a Jewish synagogue, the Academy of Sciences, with its library of 40,000 volumes, and the naval academy. The "Tower of the Sculptured Lion," one of the leading landmarks, is the only relic of the days when it was a free port. In season, the sulphur springs and sea-bathing attract many visitors. It was a mere fishing village when it came into the possession of the Florentines in 1421. Since those days it has grown in importance and prosperity, due not so much to its favorable location by the sea, as to its wise legislation and favorable labor conditions. Population of the city and suburbs, 1911, 105,315.

LEGION, *le'jun,* from the Latin *legio,* meaning *a levy,* refers to a multitude, but more commonly means a military force. In modern times it has been applied to organizations of an unusual or uncommon character, such as a distinguished corps of soldiers. The word had no military significance in Bible times, as is shown by the quotation: "And he asked him, What is thy name? And he answered, saying, My name is Legion: for we are many" (*Mark* V, 9).

SOLDIERS OF THE ROMAN LEGION

This group of statuary is a part of the arch of Constantine, in Rome.

The ancient legion of Rome, the organization which made the word popular, was a military body, varying in numbers at different periods. In the time of the republic it consisted of 4,500 men. In the time of Marius it consisted of ten cohorts of infantry; each cohort was divided into three maniples, and each maniple into two centuries. Each legion included sixty centurions, and the same number of optiones, or lieutenants, and standard bearers. The eagle was the standard of the legion.

LEGION OF HONOR, an order of merit, instituted in the year 1802, under the French Republic by Napoleon, for recognition of conspicuous military and civil services. Its aim was to pave the way for the establishment of the Empire by popularizing the idea of personal distinction. The order originally comprised three classes, Grand Officers, Commanders and Legionaries. On the restoration of the Bourbon monarchy the Legion was remodeled and lost most of its original character. There are now five classes —chevaliers, or knights; officers, commanders, grand officers, grand crosses.

BADGE OF THE LEGION OF HONOR

The vast numbers of persons advanced to this order and the lack of merit of many of those on whom it has been bestowed have detracted much from its value. In 1872 its members numbered 69,179. A law was passed in that year that only one new member should be added for every two vacancies, which reduced the membership in the next five years to 59,208. The number of chevaliers is now limited to 25,000, the officers to 4,000, the commanders to 1,000, the grand officers to 200 and the grand crosses to 70. Pensions are paid to members of the order who have served in the army or navy, but not to civilian members. No degrading punishment can be inflicted on a member of the order so long as he belongs to it. The emblem of the Legion of Honor is a white enameled star of five points, bearing an emblematic figure of the Republic, with the inscription *République Française.* On the reverse side are two flags, with the inscription, *Honneur et Patrie* (Honor and Country).

LEGISLATURE, *lej'is la ture,* the lawmaking department of a state or province and, as well, of a nation. Not always is *legislature* the legal term employed, for a constitution may declare its legislative department shall be called congress or parliament, both of which are national legislatures, or shall be known as general assembly, legislative assembly or other

similar name. Only state and provincial governments adopt the less dignified terms. Under whatever title known, the powers and duties of lawmaking bodies are practically the same, varying only to meet local needs. Legislatures are exclusively empowered to make laws and to amend and repeal them.

Usually there are two groups of lawmakers, comprised within two houses variously called senate and house of representatives, assembly and house of commons, or similar terms; these are independent of each other in a few minor respects but are distinctly related bodies for the passage of laws and a unit in the general scheme of government. One house alone cannot enact a law; the concurrence of both houses upon every detail of a bill is necessary.

The two houses of a legislative body in a state or province are usually organized after the manner of the higher lawmaking body of the nation; for example, a state legislature in the American Union finds its admirable pattern in the Congress of the United States. The legislative assembly of two Canadian provinces, Quebec and Nova Scotia, is quite similar in each case to the more important Dominion Parliament, each having two houses; the other seven provinces provide for only one house, called the legislative assembly.

Terms of service of members vary from one year to four, while compensation ranges from a stated sum for each day's actual service to a salary of several thousand dollars per year. In some states the constitution limits the length of a legislative session by depriving members of compensation after forty, fifty or sixty days; another device for shortening a session is a constitutional provision that no new bills may be introduced after a stated number of days.

In cities there is a legislature, although not so called, for a city must have its full complement of local laws, which are termed *ordinances;* the legislative body is the board of aldermen. In a village the like body is called the common council. E.D.F.

Consult Ilbert's *The Mechanics of Law Making;* Bryce's *American Commonwealth.*

Related Subjects. The reader is referred in this connection to the following articles in these volumes:

Alderman	Delegate
Amendment	Diet
Burgesses, House of	Duma
Committee of the Whole	Initiative and Referendum
Common Council	Junta
Congress of the United States	Law
Local Option	Lobby and Lobbying
Parliament	Short Ballot
Pure Food Laws	Speaker
Representatives, House of	Statute
Senate	Veto
	Zemstvo

LEGUMINOUS, *le gu' mi nus,* **PLANTS,** or **PULSE FAMILY,** the second largest family of flowering plants, various members of which are of great economic importance in all parts of the world. Some, such as peas and beans, are valued as food plants. Others are used for medicines, dyes, timber, wood, or ornament.

All have a strange and interesting power of taking nitrogen from the air by means of bacteria which live in wartlike growths on their roots. This power of bringing nitrogen to the soil makes many of the legumes valuable as green manure and cover crops for the improvement of poor soils.

About 7,000 species of leguminous plants are known. Most of them, whether trees, shrubs or herbs, bear their seeds in pods, or *legumes,* hence the family name, which the scientist calls *Leguminosae.* One large order in this family bears flowers which resemble butterflies and is therefore called *Papilionaceae,* from the Latin word for butterfly. The common sweet pea belongs to that order. Other legumes bear irregular, spreading petaled flowers; still others bear blossoms small and regular.

Related Subjects. The following important members of this great family are treated in these volumes:

Acacia	Lupine
Alfalfa	Melilot
Bean	Pea
Broom	Peanut
Clover	Sensitive Plant
Indigo	Sweet Pea
Laburnum	Tamarind
Licorice	Vetch
Locust	Wistaria

LEHIGH, *lee' hi,* **RIVER,** a river rising in the northeastern part of Pennsylvania near Wilkes-Barre, which after a winding course of 120 miles empties into the Delaware River at Easton. The part of the country through which it flows is rich in coal and iron, and by means of locks and dams the river has been made a navigable outlet for these products. The Lehigh Valley Railroad follows its course for the greater part of the way.

LEIBNITZ, *lipe' nitz,* GOTTFRIED WILHELM, Baron von (1646-1716), a German philosopher and mathematician, famous as the discoverer of differential calculus, was born at Leipzig. He was educated in the universities of Leip-

zig, Jena and Altdorf. In 1667 he entered the service of the Elector of Mainz, then the most powerful man in the country; in 1676 became the librarian of the Duke of Brunswick-Lüneburg, a post he occupied until his death. He prepared a history of the House of Brunswick, took an active part in negotiations for uniting the Roman Catholic and Protestant churches, and was the chief founder and first president of the Society of Sciences, afterwards the Berlin Academy. He also prepared for Peter the Great the plan of the famous Academy of Saint Petersburg. In 1712 he was made Imperial Privy Councilor and Baron of the Empire. His last days were spent in poverty and neglect; it was only in later times that his genius came to be fully appreciated. The writings of Leibnitz covered a wide field, including philosophy, theology, law, mathematics, history and politics.

LEICESTER, *les'ter,* noted for the manufacture of plain and fancy hosiery and of boots and shoes, is the capital of Leicestershire, England. It is situated on the Soar River, ninety-seven miles northwest of London. Tradition traces its founding to King Lear. Its present name comes from the Anglo-Saxon *Leirceastre,* meaning *fortress of the Leire,* as the River Soar originally was called. Because of its central position, its transportation facilities, by rail as well as by water, and the development of its industries, Leicester has had a very rapid growth. The city is well built and contains a town hall, adorned with many carvings, a relic of Henry VII's time, new municipal buildings, schools of music and art, and the other public buildings which every modern city now boasts. One of the ornaments of the city is a memorial clock tower, erected in 1868 in honor of Simon de Montfort, the Earl of Leicester, and three other lesser-known personages connected with the district. Population, 1911, 227,240.

LEICESTER, Robert Dudley, Earl of (1532-1588), fifth son of the Duke of Northumberland, companion of Edward VI and Princess Elizabeth. On Elizabeth's accession to the throne he was held in high favor, and by many was regarded as her lover. In 1550 he married Amy Robsart, and was thought to have been an accessory to her murder ten years later. He was created Earl of Leicester and Privy Councilor by Elizabeth, and for a time it was rumored that the marriage of the Queen and Leicester was a certainty. There was great opposition in official circles to such an alliance, and Elizabeth publicly renounced any intention of marrying him. No one knew whether such a union had definitely been decided upon. He offended Elizabeth deeply by his marriage to the Countess of Essex in 1578. See Elizabeth.

LEIF ERICSON, *life er'ik sun.* See Eric the Red.

LEIGHTON, *la'tun,* Frederick, Lord (1830-1896), an English painter, sculptor and scholar, whose art and life were always inspired by the loftiest ideals. He was born at Scarborough, and from early youth was granted every opportunity to perfect himself in the art which he loved. He first won recognition, in 1855, with his painting *Cimabue's Madonna Carried in Triumph through Florence.* During the next five years Leighton lived in Paris and then took up his residence in London. He received a medal of honor for sculpture at the Paris Exposition in 1889, and the universities of Cambridge, Oxford and Edinburgh conferred honorary degrees upon him.

In 1878 he became president of the Royal Academy, and during his tenure of that high office the institution enjoyed a material prosperity and social influence attained under none of his predecessors. He was created Lord Leighton the very day before his death. His most noted sculptural pieces are *Athlete Strangling a Python* and *Sluggard.* His paintings are numerous, each characterized by glowing color and purity and grace of form. *The Music Lesson, The Bath of Psyche, Captive Andromache* and *Ball Players* are but a few of the paintings bequeathed to an admiring posterity. In the New York Metropolitan Museum are his *Lachrymae, Lucia* and *An Odalisque.*

LEIPZIG, *lipe'sik,* one of the most prosperous and enterprising commercial and educational centers of Germany. It possesses the second largest German university, is the headquarters of the supreme courts of the empire, and is one of the most prominent literary and musical centers of Europe. In the trades of bookselling and publishing, it occupies first place in Germany, and in normal times surpasses London and Paris in the number and value of its book sales. Over 500 houses are engaged in the book trade, and about 270 newspapers and periodicals are published. The *Baedekers,* those indispensable guide books to travelers, are printed there. Wood carving and paper making are also important industries. The city is a world market for furs, and it manufactures much leather.

This interesting city is situated three miles above the junction of three small streams, the Elster, Pleisse and Parthe, and is seventy-four miles northwest of Dresden. It is 111 miles southwest of Berlin, about 500 miles northeast of Paris and about 560 miles east of London. The inner part of the ancient town, which is the hub of the business activity, has narrow streets and quaint houses, and is separated by a fine promenade from the more extensive modern suburbs, which, in turn, are edged by numerous busy manufacturing villages. Many civic improvements were introduced into Leipzig during the latter part of the nineteenth century. Among the imposing modern buildings are the Municipal Theater, one of the finest in Germany; the imperial law courts; and the new Gewandhaus, in which some of the best concerts in Europe are held. Much of its material prosperity has been made possible through its three great annual fairs, lasting from three to five weeks, and held at New Year's, Easter and Michaelmas. Their origin is traced as far back as 1180, and they have attracted as many as 30,000 merchants from Europe and Asia. Transactions to the extent of over $50,000,000 are said to take place at the Easter fair alone. The city's numerous squares and open spaces provide ample means for the stalls and booths of the retail dealers.

In addition to the university, founded in 1408, there are many other educational establishments, including a famous school of commerce and a conservatory of music founded in 1843 by Mendelssohn-Bartholdy, as well as other literary, artistic and scientific institutions. Leipzig was the birthplace of Leibnitz and of Wagner. Bach was director of music there in two of its leading churches, and Mendelssohn was director of the Gewandhaus concerts for six years. One of the scenes of Goethe's *Faust* is placed in Auerbach's Keller (wine vault), in which may still be seen frescoes illustrating the legend used by the poet.

The immediate neighborhood of Leipzig has been the scene of numerous battles, notably the Battle of the Nations in 1813, between Napoleon and the allied forces of Russia, Germany and Austria (see below). Population, 1910, 589,850.

Battles of Leipzig. Three famous battles were fought near Leipzig, two of them in the Thirty Years' War and one in the war with Napoleon. The first, which took place in September, 1631, and resulted in victory for the Swedes and Saxons, under Gustavus Adolphus, over the imperial army under Tilly, was the first important obstacle met by the Roman Catholics in their struggles in Northern Europe. In the second battle of Leipzig, or Breitenfeld, which occurred in November, 1642, the Swedes were again victorious over the Imperialists. The third was the great victory of the allied Prussians, Russians, Austrians and Swedes over the French under Napoleon. This engagement, which is also called the "Battle of the Nations," practically secured Germany's freedom. R.D.M.

LEIPZIG MONUMENT
Commemorating the "Battle of the Nations."

LEITH, *leeth,* the seventh largest town in Scotland. The foreign, colonial and coasting trade of this seaport town is of ever-increasing importance, and it has steamboat communication with London, the north of Scotland, several continental ports and with New York. Leith is situated on the Firth of Forth, two miles north of Edinburgh, with which it is connected by a street solidly lined with buildings; its history is to a large extent associated with that of Edinburgh. Among the newer buildings are the courthouse, custom house, exchange, Trinity House, hospital, Sailors' Home and Saint James's Episcopal Church. Leith Fort is now artillery headquarters in Scotland. Among the manufactures are machinery, sailcloth, ropes, soap, bottles and flour; shipbuilding is carried on extensively, and there is a thriving trade in distilled liquors and fishery products. Population, 1911, 80,490.

LELAND, Charles Godfrey (1824-1903), an American who acquired fame as a humorist, poet, journalist and miscellaneous writer. After graduation at Princeton University in 1845 he studied in Europe, at Heidelberg and Munich and later in Paris. He was in the latter city during the revolution of 1848, and was a member of the American delegation appointed to congratulate the new government on its success. Leland returned to Philadelphia, studied law and in 1851 was admitted to the bar.

During his student years he had been a prolific writer, and this work he continued with such promise of financial independence from it that he soon abandoned the law and gave his time entirely to literature. One of his greatest successes was *Hans Breitmann's Ballad,* written

in Pennsylvania Dutch and filled with humorous phases and amusing adventures. So strongly did this appeal to the people that Leland himself came to be called Hans Breitmann, but he refused to adopt this pseudonym.

He spent much time in New York, established in Boston the *Continental Magazine,* in which he advocated the emancipation of slaves, and passed two years in London studying the gypsies. He left much work relating to these people.

LELAND STANFORD JUNIOR UNIVERSITY, a coeducational institution, at Palo Alto, California (post office, Stanford University, Cal.), thirty-three miles south of San Francisco. It was founded by Leland Stanford and Jane Lathrop Stanford, his wife, in memory of their only son, Leland Stanford, Jr., who died in 1884, at the age of fifteen. The original endowment consisted of about 90,000 acres of land in various parts of the state; the Stanford ranch at Palo Alto, the immediate grounds of the university, includes 9,000 acres. To this landed endowment was added a bequest of $2,500,000 in the will of Mr. Stanford, and the residue of his estate was turned over to the university during her lifetime by Mrs. Stanford, increasing the endowment to approximately $25,000,000. The Founding Grant was executed in 1885, the corner stone of the first building was laid in 1887, and the institution was opened to students on October, 1891, with an enrolment of 559.

The buildings of the university are an adaptation of the old Spanish Mission architecture, reproducing on an imposing scale the open arches, long colonnades and red tile roofs of the early missions of California. The central group of buildings constitutes two quadrangles, one surrounding the other, and both connected by arcades. The inner quadrangle of twelve one-story buildings opens through a continuous arcade upon a paved court, three and a quarter acres in extent, diversified by circles of tropical plants. The fourteen buildings of the outer quadrangle are two stories in height and are surrounded by an arcade opening outward. The soft buff sandstone and grayish-red tile roofs harmonize in the California sunshine with the golden-brown slopes of the Mount Hamilton range of mountains in the foreground and with the deep blue of the Santa Cruz range in the background.

Tuition is free in the university, except in the professional courses of law and medicine. An incidental fee of fifteen dollars a semester is paid by undergraduate students, from which graduate students are exempt. The departments of the university are those of anatomy, applied mathematics, bacteriology and immunity, botany, chemistry, civil engineering, economics, education, electrical engineering, English, entomology and bionomics, geology and mining, Germanic languages, Greek, history, Latin, law, mathematics, mechanical engineering, medicine, philosophy, physics, physiology and histology, psychology, Romance languages and zoölogy. The professional courses in law and medicine are organized into schools, the medical school being located in the city of San Francisco. The university maintains a marine biological laboratory with a summer session on Monterey Bay. In 1916 it had a student enrolment of over 2,200, and its faculty numbered about 210. The library contains about 280,000 volumes, including those of the Lane Medical Library in San Francisco.

The distinguishing feature of Stanford University is its freedom in the choice of studies. Students are encouraged to elect their own subjects, under the advice of the major professors. The purpose of the university, as stated by Senator Stanford, is "to fit students for personal success and direct usefulness in life." The mastery of a major subject, with free election in collateral work, helps greatly toward this end. It was the wish of the founders also that a truly democratic spirit should be fostered in the institution and that its facilities should be reserved for earnest students of definite aim, those being excluded who might "wish to acquire a university degree or educational veneer for the mere ornamentation of idle and purposeless lives." G.A.C.

LE MANS, *le maN',* a town in central France, capital of the department of Sarthe. It is built on a hill above the River Sarthe, about 115 miles southwest of Paris. At the time of the Roman conquest (60 B.C.) it was the chief city of the barbarian tribe known as the Cenomani; the Romans fortified it and later it became one of the important cities of the Franks. Henry II, the first of the Plantagenet kings of England, was born at Le Mans. The French were defeated there by the Germans in 1871, during the Franco-German War. In spite of many sieges sustained by the historic old city, the fine Gothic cathedral of Saint Julien, which dates from the eleventh century, is unharmed. The chief manufactures are chemicals (especially sulphuric acid), woolen and linen goods, hosiery,

tobacco, leather, machinery and railway cars. Population of city and suburbs, 1911, 69,400.

LEMAY, *le ma',* Léon Pamphile (1837-), a French-Canadian librarian and poet, best known for his translation of Longfellow's *Evangeline* into French verse. Lemay was born at Lotbinière, Que., and received his schooling at the Quebec Seminary and the University of Ottawa. At first he studied theology, but soon abandoned it for the law, and in 1865 was called to the bar. Two years later, in 1867, he was appointed librarian to the Quebec legislature, a position he held for twenty-five years. His first volume of poems, which appeared in 1865, was called *Essais Poetiques (Poetical Essays).* It was followed in 1870 by the translation of *Evangeline* and by numerous other works, including *Poèmes Couronnés (Crowned Poems); Les Vengeances; Fables Canadiennes; Rouge et Bleu;* and a volume of sonnets, *Les Goutellettes.*

LEMBERG, *lem'berK,* a city of Austria-Hungary, and capital of the crownland of Galicia, is situated on the River Peltew, 365 miles northeast of Vienna. It is fourth in population among the cities of Austria, being exceeded only by Vienna, Prague and Trieste. The place is defended by a citadel, around which the modern town has grown up; most of the prominent buildings are found in the suburban districts. There are many imposing Greek and Roman Catholic cathedrals, and the city also possesses the third largest university in Austria. In the Ossolinski National Institute are valuable collections of Polish historical and literary relics, besides a library of over 180,000 volumes. There are manufactures of farm machinery, boilers, musical instruments, candles, flour and other commodities, and in time of peace the city enjoys a considerable trade in agricultural products.

Lemberg was founded in the thirteenth century, and has had a varied history, having suffered many times from siege and bombardment. Early in the War of the Nations (which see) the Russians began an offensive movement in Galicia, resulting in the capture of Lemberg, which they held until June, 1915. Its recapture by the Austro-German forces, during the spectacular drive against Warsaw, meant the loss of an important base of supplies for the left wing of the Russian army. Population, 1914, 212,000.

LEMIEUX, *le mye',* Rodolphe (1866-), a Canadian statesman, one of the leading members of the Liberal party, and author of the Lemieux Act of 1907, which was aimed to help in the elimination of strikes and lockouts by providing government conciliation. Lemieux was born at Montreal, Que., attended Laval University, and was called to the bar in 1891. He was elected to the House of Commons as a Liberal in 1896, and has served since without interruption. He entered the Laurier Ministry in 1904 as Solicitor-General, was Postmaster-General from 1906 to 1911 and during four months in 1911 was Minister of Marine and Fisheries. Lemieux was successful on several difficult diplomatic missions, notably one to Japan in 1907, when he succeeded in inducing the Japanese government to restrict emigration to Canada. He also maintained his standing at the bar and was professor of the history of law at Laval University.

LEMMING, *lem'ing,* a small animal related to the field mouse, of a clumsy form, large head and short, thick legs. Its length is about six inches, of which nearly an inch is included in the little, stubby tail. Lemmings live in shallow burrows dug in the dry parts of swampy ground, under stones or in the peaty soil. The European lemming is the best-known species; other varieties are found in the northern parts of both hemispheres. The lemming sits very quietly near its burrow most of the day, and is active during the night. If molested it sets up a loud squeaking and grunting, much like a guinea pig. If cornered, it bites viciously, springing at the intruder with short leaps.

THE LEMMING

The lemming lives on buds of the dwarf birch, roots, grass and reindeer-moss. In the winter it lives on what it can find under the snow. Like other fur-bearing animals which live in cold countries, it turns white in winter. In Europe it migrates occasionally in immense troops, often numbering hundreds of thousands, devouring every green thing in its course and doing as much damage as the migratory locust. It advances stubbornly in one direction, crossing mountains, swimming rivers and permitting nothing but an impenetrable barrier to alter its course. Thousands die from hunger, disease, fatigue and accidents, and many are killed by beasts and birds of prey that follow them. They move steadily on until they reach

their destination; if, however, a large body of water appears before them they plunge in and meet death by drowning.

LE MOINE, *le moyn',* or *le mwhaN',* Sir James MacPherson (1825-1916), a Canadian historian and naturalist, who wrote with equal facility in French and English. He was born at Quebec, was educated there at Le Petit Séminaire, and was called to the bar in 1850. For a number of years he was collector, and then inspector, of inland revenue at Quebec, but later he devoted himself to literary work. He gave much of his time to the study of natural history, especially birds, and his *Birds of Quebec* and *L'Ornithologie du Canada* are among his most popular writings. In addition to ornithology Sir James became a specialist in archaeology and history, subjects in which he was noted for carefulness in investigation and impartiality in his conclusions. Among his many books are *Legendary Lore of the Saint Lawrence; The Fisheries of Canada; Quebec, Past and Present; Canadian Heroines,* and *Annals of the Port of Quebec.*

LEMON, *lem'un,* the fruit of a tree of the citrus group, whose thick outer rind is the source of a valuable oil, and in whose pulp is found the acid juice used everywhere in making the popular beverage known as lemonade and as a flavor in cookery. The lemon tree, which belongs to the same group as the orange and the lime, grows wild in India, and is supposed to have been introduced into Europe during the Crusades, about the year 1200. It is now cultivated in Italy and the neighboring islands, in Spain and Portugal, in Mexico and in the warm states of California and Florida. It grows from ten to twenty feet in height, bearing long, willowy branches which are meagerly clothed with pale-green leaves. The flowers, which are small and marked on the outside with purplish lines, are fragrant, but less so than their cousins, the orange blossoms.

The lemon tree begins to bear the third or fourth year and comes into full bearing the sixth or seventh year. The average yield for one tree is between 200 and 300 pounds a year, this figure varying with the care given and the weather conditions. Trees are usually planted one hundred to the acre, so a grower expects an annual yield of from 2,000 to 3,000 pounds per acre. In Northern California lemon groves in full bearing have a value of from $750 to $1,500 per acre, and in Southern California the price ranges from $1,000 to $2,500. The life of the lemon tree averages about forty years.

The fruit of the lemon tree is classed by botanists as a berry. It is shaped like an egg, and its light-yellow outer rind has a rough appearance, which is due to the numerous oil glands imbedded in its surface. On the inside of the peel is a white, spongy, almost tasteless inner rind, while the whole interior of the fruit is filled with a juicy, sour, light-colored pulp. This is divided into ten or twelve sections, each of which contains two or three seeds.

THE LEMON

(*a*) Cross section of fruit
(*b*) Flower
(*c*) Stamens and pistil
(*d*) Whole fruit

Above is a branch showing arrangement of leaves.

Since lemons do not keep well if allowed to ripen on the tree, they are gathered while still green and placed upon trays in cool, dark rooms. As the fruit slowly ripens, its rind becomes tougher, thinner and more pliable, conditions which promise good keeping qualities during the process of shipping. On their removal from the curing rooms the lemons are sorted, graded, wrapped in tissue paper and packed in boxes.

Lemon extract, or oil, which is widely used for flavoring and as a basis for perfumes, is obtained by pressing the oil from the peel. The juice of the pulp, whose tart, agreeable flavor is due chiefly to the citric acid contained in it, has several uses. Cold lemonade is one of the most refreshing of summer beverages,

and hot lemonade is highly valued for breaking up a cold. Lemon juice will restore the color to cloth discolored by alkali stains; its efficacy in removing such spots from the hands is well known. Medicinally, it has mildly laxative qualities. Calico printers use it to produce greater clearness in the white part of patterns dyed with colors containing iron, and it is also an important source of commercial citric acid (which see).

The Industry in America. From two great fruit-bearing states, California and Florida, is obtained practically the entire lemon crop of the United States, which amounts annually to about 2,770,000 boxes, valued at nearly $3,000,000. Of this output, California produces 99½ per cent, the yearly crop averaging 2,756,000 boxes, or 5,000 carloads, valued at about $2,976,500. Each year there are imported into the United States and Canada over 150,000,000 pounds of the fruit, having a value of over $6,000,000. Nearly all importations are from Italy, of which the United States is becoming a keen competitor. B.M.W.

LEMUR, *lee'mur,* an animal allied to the monkey, native to Madagascar, though also found in Africa, India and the Comoro Islands. The lemur is lower in the zoölogical scale than the ape and the monkey, its brain being simpler

THE LEMUR

in structure. It is a pretty little animal, about the size of a cat, with soft fur and long, bushy tail. The head is round and the nose so long and pointed that it has been called the *fox-nosed monkey.* It lives in trees, eats fruits, insects, small birds, eggs, reptiles, etc. Of the fifty species the best known are the *ring-tailed,* which is gray in color with black and white rings around its tail; the *ruffled,* one of the largest of the species; the *mouse lemur,* which is about the size of a rat; the *indris,* which is black with white legs. The lemur is easily tamed and is very playful in captivity.

Lemur means *ghost,* a name given the little animal on account of its spectral appearance and its habit of feeding at night. Its howl resembles that of a dog, and for this reason the natives of Madagascar give it a name which means *dog of the forest.*

LE'NA, a river of Eastern Siberia, the main trade artery of a large district. It rises on the slopes of the Baikal Mountains, 186 miles northeast of Irkutsk. Its entire length is 2,700 miles, the whole of which lies in the Russian dominions. At Irkutsk it attains a width of six miles, then flows north to the Arctic Ocean, where it forms a delta 250 miles wide. The chief tributaries are the Vilim, Kirenga, Olekma, Aldan and Vilyui. There is little agricultural land along its upper course, and it becomes navigable at its junction with the Kuta River, about 430 miles from its source. Along its middle course the country is sparsely inhabited by Yakuts, a people who live by fishing.

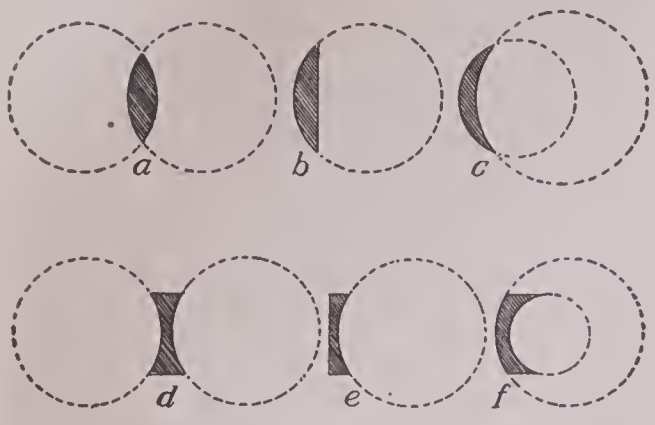
It is claimed that the difference between the summer and winter temperature along the Lena is the greatest known. At Kirensk the river is frozen from October to April; at Yakutsk, from October until the last of May. Olekminsk, Vitimsk, Verkholensk, Bulun and Yakutsk are its principal ports. The commerce consists chiefly of minerals, grain and fish, which are carried in wooden barges built in the shipyards at its various ports. At the mouth of the Lena there is considerable ivory trade from tusks of prehistoric animals found in the new Siberian Islands. The victims of the *Jeannette,* a north-polar expedition vessel, are buried on an island in the delta. The river drains an area of about one million square miles, nearly equal to one-third the area of Canada.

LENNI-LENAPE, *len'i len'a pe.* See DELAWARE (Indians).

LENOX, *len'uks,* JAMES (1800-1880), the founder of Lenox Library and a benefactor of many charities, was born in New York City. He was graduated from Columbia College and for forty years devoted himself to the collection of rare books and works of art. His gifts to the Presbyterian Hospital, the Philipps Memorial Church, the Presbyterian Home for Aged Women and to the Lenox Library amounted to over $2,000,000.

LENS, *lenz,* a transparent substance, having at least one curved surface. Lenses thickest in the middle are convex; those thickest at the edges are concave. The six kinds of lenses are shown in the figure on page 3380, and there is explanation of their forms.

When a ray of light passes through a lens it is bent towards the thickest part. Accordingly, light rays passed through a convex lens



LENSES

The six forms of lenses. The first three are *converging* lenses, thicker in the middle than at the edges; the lower three are *diverging*, thinner at the middle than at the edges:
(*a*) Double-convex—both surfaces convex.
(*b*) Plano-convex—one surface convex, one plane.
(*c*) Concavo-convex—one surface convex, one concave.
(*d*) Double-concave—both surfaces concave.
(*e*) Plano-concave—one surface concave, one plane.
(*f*) Convexo-concave—one surface concave, one convex.

tend to meet in a point, or *focus*. Parallel rays such as a, b, c, d (Fig. 2), passing through the double-convex lens *X Y*, converge at *M*, the *principal focus*. A familiar illustration is furnished by the burning-glass (which see), which brings the sun's rays to a point, so concentrating their heat as to ignite inflammable substances.

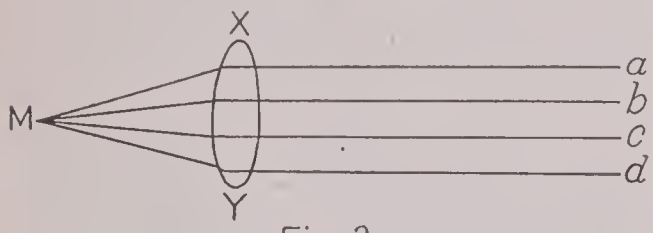


Fig. 2

Images produced by convex lenses are of two sorts—*real* and *virtual*. A ray passed through the optical center (Fig. 3) of a lens is not refracted. Such rays are called *axial*. The principal axis *L N* passes through both the optical center and the principal focus *H*. All rays parallel to the principal axis are so bent as to pass through *H*. Where *R P* crosses the axial ray at *R*, the image at *r* is found. Similarly *Q* is found at *q*. The resulting image is inverted and *real*. It is smaller or larger than the object, according as the object is at a distance greater or less than twice the focal length *C H*.

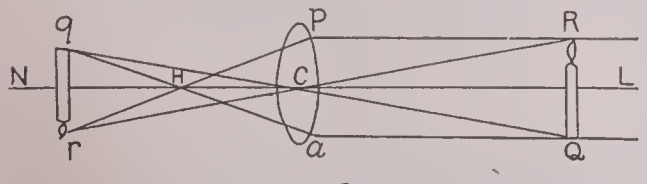


Fig. 3

When the object is within the focal distance *G L* (Fig. 4), the image appears on the same side as the object, erect and magnified. Such an image is called *virtual*.

The parallel rays from *N* and *R* are bent, and meet at the focal point *G*. The rays *L N* and *L R*, being axial, are not refracted. The image *N R* appears where the axial rays meet

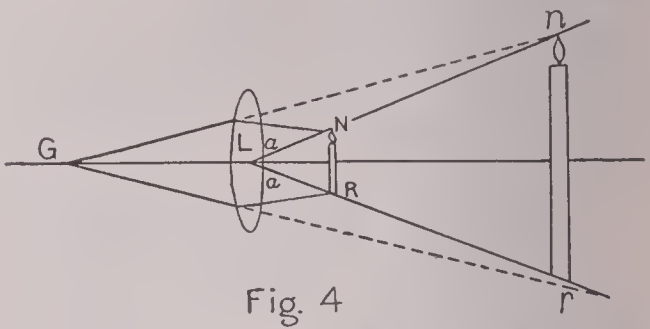


Fig. 4

the refracted parallel rays, which is on the same side as the object. The illustration shows the use of the double-convex lens as a magnifying glass. Images formed by concave lenses are erect, virtual and smaller than the object. Thus the reducing glass is exactly the opposite of the magnifying glass, being double-concave instead of double-convex.

Related Subjects. The following articles in these volumes will be of interest in connection with a study of light:

Aberration	Polarization of Light
Camera	Physics
Diffraction	Reflection
Ether	Refraction
Fluorescence	Spectroscope
Light	Spectrum Analysis
Microscope	Telescope
Mirror	

LENT, from the old English word *lenten*, meaning *spring*, is the season of fasting which begins with Ash Wednesday, forty days before Easter, and ends with Easter Sunday. It is observed by the Roman Catholic, the Eastern and the Anglican churches. In modern times much latitude is allowed in the observance of Lent, the age, health and occupation of individuals being taken into account. See EASTER, for explanation of the above movable dates.

LEN'TIL, an ancient food plant, one of the first cultivated by man. It is said that the lentil found in Egypt was the pottage for which Esau gave his birthright. It belongs to the family of plants called legumes, which bear seeds in pods, like the pea and bean, and it has

many varieties. It thrives best in light, dry soil, as rich soil yields few pods. The European countries bordering on the Mediterranean Sea and Egypt and Western Asia produce the greatest supply.

The seeds are the part used for food. They are white, brown or black, and are of various sizes, never growing larger than half an inch in diameter. When cooked they are reddish in color. They have a pronounced flavor, are among the most nutritious of legumes, being rich in protein and carbohydrates, and are used for the most part in making soup. Excellent fodder for sheep, horses and cattle is provided by the vine. Lentils are not well known in the United States, the supply found in the markets being imported.

LENTIL, BRANCH AND SEED

LEO, the name of thirteen Popes. Of these, Leo XIII was one of the greatest occupants of the Papal chair. Several others won for themselves permanent places in history.

Leo I, known as Saint Leo, was Pope from 440 to 461. Even before his accession he was recognized as one of the foremost of the Church "fathers," and his election aroused general enthusiasm. He regarded himself as universal bishop, and attempted to use his strong position to put down a heresy which had gained considerable headway, but in vain. In secular history Leo I bears a dramatic part. When Attila I invaded Italy, Leo, commissioned by the Emperor Valentinian, went to meet him and induced him to spare the city of Rome. Later, when another raid threatened under Genseric, the Pope persuaded the Vandal chief to refrain from burning the city and putting the inhabitants to death.

Leo III, Pope from 795 to 816, is chiefly memorable as the pontiff who crowned Charlemagne and so assisted in founding the Empire of the West. His rule was much disturbed by various outbreaks, and in 799 he besought the protection of Charlemagne, who in the next year visited Rome. In return for the Pope's services, Charlemagne guaranteed his temporal sovereignty over the States of the Church, with the understanding that the emperor should retain a protectorate over them.

Leo IX, who reigned from 1048 to 1054, was a cousin of the emperor, Conrad II. A man of learning and of upright life, he strove to reform abuses in the Church, opposing simony, or traffic in sacred things, and insisting upon the celibacy of the clergy. He traveled in France, Italy and Germany, holding councils and laboring to strengthen the authority of the Papal office. In 1053 he was taken prisoner by the Normans in Southern Italy, and held in honorable captivity until a few weeks before his death.

Leo X was of the famous family of the Medici, a son of Lorenzo the Magnificent. He was born in Florence in 1475, made a cardinal at the age of thirteen, and after some years spent in travel and in study was chosen Pope in 1513. Before all else, Leo X was a scholar and a patron of learning. He chose scholars for high positions at his court, and made Rome the center of the artistic and literary world, as it had long been the center of the world's religion.

But his reign was by no means without political significance. In order to gain funds for the rebuilding of Saint Peter's, he permitted the preaching of indulgences, and this was one of the things which roused the active opposition of Martin Luther and led to the outbreak of the Reformation. Leo issued a bull against Luther in 1520, which the reformer burned, but it does not appear that the Pope ever viewed the Reformation seriously.

Leo XIII (1810-1903), had one of the longest reigns in the history of the Papacy, from 1878 to 1903, and proved himself a most active and enlightened pontiff. He was born at Carpineto, Italy, his name until his elevation to the Papal throne having been Gioacchino Vincenzo Raffaello Luigi Pecci. After studying in the Jesuit College at Viterbo and in Rome, in 1837 he was ordained a priest and named domestic prelate to Pope Gregory XVI. A noteworthy early achievement was his suppression of brigandage and smuggling in Benevento, while delegate to that duchy in 1838. Later he was delegate at Spoleto and at Perugia, and in 1843 was made archbishop of Damietta.

In 1846 he was consecrated archbishop of Perugia, and there he remained until 1878, having in the meantime (1853) been created

cardinal. When Pope Pius IX died in 1878 he was elected his successor at the age of 68. His reign was a most notable one in the history of the Church. He restored the hierarchy to Scotland, established one in India and brought to a triumphant conclusion the religious struggle with Germany. A Holy Father of great

LEO XIII

moderation, he constantly urged Catholics in all parts of the world, notably in Canada and in Ireland, to refrain from opposition to their legitimate governments, but he never could bring himself to recognize the authority of the Italian government over Rome, to the last regarding himself as a prisoner in the Vatican. He was a scholar, the author of excellent Latin verse, and a patron of literature. G.W.M.

For a list of all the Popes, see the article POPE, in which is also a detailed account of the method of election to the Papal chair. Consult Milman's *History of Latin Christianity;* Mann's *Lives of the Popes in the Early Middle Ages;* Vaughan's *The Medici Popes;* Keller's *Life and Acts of Leo XIII.*

LEO, THE LION, the fifth zodiacal constellation, occupying the sign of Virgo. This is one of the oldest of constellations, and was described as a lion in the oldest known zodiac. The principal star in this constellation is Regulus, sometimes called *cor leonis*, or the *heart of the lion*. It is a star of the first order, or magnitude, the stars Beta and Gamma being of second magnitude. There are ninety-five stars in this constellation, which is also remarkable for its nebulae.

Leo is the fifth sign of the zodiac, between Virgo and Cancer, and is entered by the sun about July 22. The astronomical symbol is ♌, the origin of which is not quite clear, though it has been suggested that it represents either the breastbone or the tail of the lion. According to the Greeks Leo is the Nemean Lion which was slain by Hercules.

For illustrations, see STAR; ZODIAC. For explanation of magnitude, see STAR.

LEOMINSTER, *lem'in ster,* MASS., is situated in Worcester County, northeast of the geographical center of the state, on the Nashua River. It is noted for its extensive manufacture of celluloid and horn specialties, which exceeds that of any other city of the United States. Fitchburg is five miles north, Worcester is eighteen miles south, and Boston is forty-five miles southeast. The city is served by the Boston & Maine and the New York, New Haven & Hartford railways; electric lines connect with towns in all directions. Leominster was settled in 1725, and was a part of Lancaster until it was incorporated as a separate town in 1740; it was incorporated as a city in 1915, and was named for the English town Leominster. The population increased from 17,580 in 1910 to 20,839 (estimate) in 1916.

Leominster is not excelled by other cities of its size in the variety of its manufactures; among these combs take the lead. Locally it is known as the *comb town*. Celluloid and horn specialties, hairpins, buttons, jewelry, toys, shirts, baby carriages, pianos and furniture are other important manufactures. In addition to its public schools the city has a Carnegie library. Whalom Lake and Whalom Park are adjacent pleasure resorts.

LEÓN, *la ohn',* the largest city of Nicaragua and capital of the department, or province, of the same name, is situated about fifty miles northwest of Managua and thirteen miles from the Pacific Coast. Its cathedral and the College of San Roman, founded in 1678, for a long time one of the most celebrated institutions for learning in America, are among the finest structures in Central America. The city is connected by railway with the port of Corinto and is an important trading center. Population about 62,500.

LEÓN, or **LEÓN DE LOS ALDAMAS,** *la ohn' da lohs al dah' mahs,* a city of Mexico, prosperous in times of peace in the republic, is situated in the southern part, in the state of Guanajuato, at an elevation of 6,000 feet above sea level. It lies in a rich farming section and enjoys a thriving trade in wheat and other grains. The principal manufactures are leather, cottons,

woolens, saddlery and gold and silver embroidery. The Mexican Central Railway serves the town. Population, 1910, 57,700.

LEONARDO DA VINCI. See VINCI, LEONARDO DA.

LEONIDAS, *le on' i das,* king of Sparta, successor to his brother Cleomenes I in 491 B.C. When the Persian monarch Xerxes approached the Grecian states with an immense army Leonidas opposed him at the narrow pass of Thermopylae with a force of several thousand, including 300 Spartans, 700 Thespians and 400 Thebans. For two days the heroic little band resisted the attacks of the great Persian army, showing the most wonderful courage. On the third day of the conflict, through the treachery of a Greek named Ephialtes, who betrayed to the Persians a mountain path, Leonidas and his little army were assailed from the rear, and before the sun went down not one remained of the Spartans and their heroic Thespian and Theban allies. The other allies had been allowed to withdraw when the danger became evident. See THERMOPYLAE.

In later years pillars were set up to commemorate the bravery of the Greeks, who were buried where they fell. One tablet bore the words:

"Four times a thousand men from Pelops' land
Three thousand times a thousand did withstand."

Over the Spartans stood another column with these words:

"Go tell the Spartans, thou that passeth by,
That here, obedient to their laws, we lie."

LEOPARD, *lep' erd,* a fierce animal, the third in size of the cats of the Eastern Hemisphere, being excelled in dimensions only by the lion and the tiger. It is a graceful, alert and cunning animal, and in size and color is the most variable of all the large cats. The color is usually of a light tan, generously spotted, and the tail is ringed. The characteristic marking of these animals, "the unchanging leopard spots," makes their fur of great value. The black leopard is of so dark a hue as to make the spots almost imperceptible. Leopards feed on such mammals as monkeys, sheep, goats and dogs, and, like other great cats, they prey especially upon the latter. Seldom do they attack human beings, but once having discovered that people are easy victims, they may be more dangerous than the tiger or lion. These great cats frequent wooded districts, and are found throughout India, Persia, Ceylon, Arabia and Africa. See CHEETA.

THE LEOPARD

ENRAGED!

LE'OPOLD, the name of two kings of Belgium. They were father and son, but unlike in their conduct of the affairs of their kingdom and in their personal lives.

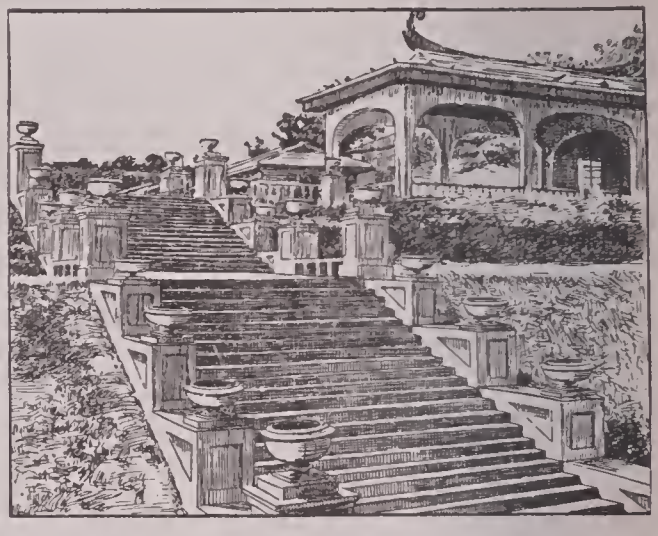
Leopold I [GEORGE CHRISTIAN FREDERIC] (1790-1865), a king of Belgium, the son of Francis, Duke of Saxe-Coburg, and uncle of Queen Victoria of England, was born at Laeken. He received an excellent education and later took an active part in Russian military affairs under the Emperor Alexander I. In 1816 Leopold married Princess Charlotte, daughter of King George IV of England; she died the next year. The throne of Greece was offered to him, but he refused it, and in 1831 he was elected king of the Belgians, who had revolted against Holland's rule. A year later he married Princess Louise, daughter of Louis Philippe of France. A son, Leopold II, succeeded him (see below). His wise and moderate rule laid the foundation for the later prosperity of the Belgian kingdom.

Leopold II [LOUIS PHILIPPE MARIE VICTOR] (1835-1909), became king of Belgium in 1865. He was the uncle of Albert I, who succeeded him in 1909. He organized the African International Association for the purpose of developing the natural resources of the Congo River region, financed Stanley's famous explorations in South Africa, and was given control of the Congo Free State in 1885, when it was taken over by Belgium. Affairs among the natives engaged in rubber and ivory industries there were conducted so disgracefully by him as to call forth severest criticism from other nations (see CONGO). Leopold was survived only by daughters, and as women are not permitted to wear the crown of Belgium, the nearest male heir succeeded to the kingship. See ALBERT I.

Consult MacDonnell's *King Leopold II;* Rapoport's *Leopold, King of the Belgians.*

LEPIDOPTERA, *lep i dop' te ra,* from two Greek words, *lepis,* meaning *scale,* and *pteron,* meaning *wing,* is that order of insects which includes the butterflies and the moths. The name has reference to the fact that the wings are covered with tiny scales or flattened hairs. Members of this group pass through a slow series of changes, known as *metamorphosis,* before they reach their adult form. There are first the eggs, then caterpillars, which grow and shed their skins frequently, then the cocoon, and finally the moth or butterfly. See BUTTERFLY; INSECT; METAMORPHOSIS; MOTH.

Consult *List of North American Lepidoptera and Key to the Literature of This Order of Insects* in United States National Museum Bulletin 52 (Washington, D. C.).



IN THE LEPER COLONY ON CULION ISLAND

This enterprise is situated about 200 miles from Manila. At the left are pictured sanitary quarters of the victims; at the right, the lepers' theater and its attractive approach.

LEP'IDUS, MARCUS AEMILIUS (? -13 B. C.), dictator of Rome during Julius Caesar's absence in Spain (49-48 B. C.), colleague of the latter in the consulate (46 B. C.), and appointed to the government of Nearer Spain by Caesar in 44 B. C. After the assassination of the great Roman leader, Lepidus supported Mark Antony and became one of the triumvirate with Octavius (later the Emperor Augustus) and Antony. His lack of statesmanship, weakness of character and want of military talents made him inferior in importance to the other two, who gave him Africa as his province. In 36 B. C. he made a desperate attempt to seize Sicily, but his soldiers deserted him and went over to his rival, Octavius. The latter permitted him to retain his wealth, but compelled him to live in retirement.

LEPROSY, *lep'ro si,* the most universally dreaded disease. Leprosy affects the skin and has numerous forms, classified in three groups: *macular,* in which the skin shows dark red or black stains; *anesthetic,* in which there is a loss of sensation in the patches of afflicted tissue; and *tubercular,* marked by areas of granulated tissue, that is, tissue covered with small, red grainlike elevations. Patients are sometimes afflicted with a form of leprosy combining the three varieties; in the two first named the nerves are slowly destroyed.

Leprosy is spread by contagion and is not hereditary. It probably enters the system through the passages of the nose and throat, and takes from two to seven years to develop. The spots attacked first show small white lumps, which later ulcerate. These ulcerations are usually on the exposed skin of the face and hands, but they sometimes attack other parts of the body. In deep ulceration the flesh and even the bones are destroyed.

Lepers always have been shunned. In Biblical and medieval times they were forced to dress in an easily-identified costume and carry rattles or clappers to warn others of their approach. Until recently leprosy was supposed to be incurable. An antivenomous serum was successful in a few cases, but the best remedy for leprosy, chaulmooga oil, has been known for years by East Indians. The treatment must be kept up for a period of several years. Formerly the patient was so nauseated by the oil that he usually abandoned its use. This oil, however, has been used successfully in a number of cases by Dr. Victor G. Heiser, head of the United States leper colony on the island of Culion, in the Philippines. He overcomes its nauseating effects by mixing it with camphorated oil and resorcin; it is given hypodermically.

The colony on Culion is the largest in the world, and has 8,000 lepers within its limits. Until the establishment of the colony these lepers were living unhygienically and mingling with healthy people. They are all from the Philippine Islands. Louisiana has a small hospital for lepers, and the colony at Molokai, Hawaii, cares for about 1,100 victims. The good these leper colonies are accomplishing in curing and controlling the disease is immeasurable, and it is possible that some day leprosy may be exterminated. See MOLOKAI.

Consult Blue's *The Public Health Aspects of Leprosy:* also *Studies upon Leprosy,* in *Public Health Bulletin* No. 61 (Washington, D. C.).

LESAGE, *le sazh',* ALAIN RENÉ (1688-1747), a French novelist and dramatist, whose most enduring work, *Gil Blas* (1715), was a forerunner of the realistic novel of later French literature. It was not only his finest literary achievement, but was a masterpiece of eighteenth-century fiction. *Gil Blas,* the story of a Spanish youth who lives down the indiscretions of his early days and develops a character worthy of admiration, has been aptly called "a gospel of a worldly-wise man's common sense." Lesage is also remembered for his novel *The Devil on Two Sticks* and the comedy *Turcaret.* The latter gives with cruel realism a picture of the narrowness and pettiness of Parisian life. He was one of the early masters of style, and his manner of writing is still praised for its ease, naturalness and pithiness.

LESCARBOT, *le skahr'bo',* MARC (about 1570-1630), a French explorer and colonist, whose accounts of his voyages form one of the most important sources of early Canadian history. In literary merit these records rank high, and Lescarbot has been styled "the French Hakluyt." Lescarbot was a lawyer by training, but in 1605 joined his friend Poutrincourt on an expedition to relieve Port Royal. He returned to France in 1607, and two years later issued his principal work, the *History of New France.* The title is misleading, for he covers not only New France, but narrates the voyages of Verazzano, gives the story of the settlement of Florida, Brazil and Acadia, and gives other details which are not now considered as a part of French-Canadian history.

LES MISERABLES, *la me za rah'bl',* one of the world's great novels—a "prose epic" which presents a powerful plea for the poor and unfortunate. It was written by the French novelist Victor Hugo, and was published in 1862. Its title means "The Wretched Ones," and the author has supported well his theory that much of the crime of the poorer classes is the direct result of the injustice to which they are subjected. The central figure, Jean Valjean, is a character of great strength and nobility. Forced by dire necessity to steal, he is turned into a veritable criminal by the sort of punishment which is meted out to him, and is saved from a desperate career only by the influence of the saintly Bishop Myriel. Later, when he has made of his own life a beneficent influence, he is thrown again into bitter shame by a malicious enemy, but in the end is saved by his love for little Cosette. The memory of the Bishop is also an inspiration to him throughout his life.

This remarkable romance of Victor Hugo's was written in French, but on the very day on which it appeared in the French bookstalls, it appeared also in ten other languages in eight different cities. From the first it was popular, for despite its prevailing gloom it has a note of optimism, a gospel of redemption through love and service. Besides the leading character, there are others of scarcely minor interest, notably Fantine, Gavroche, Marius and Cosette; and the plot which binds them together is a complex one. Few portions of the book are more discussed than the famous description of the Battle of Waterloo, but the reader who takes up the book for the first time will probably find his enjoyment heightened if he omits this and returns to it afterward, when it will not interfere with the movement of the story. Dramatic versions of the story have been presented on the regular stage and in moving pictures. See HUGO, VICTOR. • A.MC C.

LESSEPS, *le seps',* FERDINAND, Vicomte de (1805-1894), a French diplomat and civil engineer who achieved fame through his construction of the Suez Canal. He was born in Versailles and served as consul at Madrid, Cairo and other capitals. While on a second visit to Egypt, in 1854, he obtained a charter from Said Pasha to construct a canal which would unite the Mediterranean and Red seas. The Egyptian government defrayed the expense, and this great work, about 100 miles in length, was carried to completion in thirteen years.

The scheme of connecting the Atlantic and Pacific oceans by means of a canal across the Isthmus of Panama had possessed an intense interest for De Lesseps, as well as other scientific men, and in May, 1879, an International Congress convened in Paris to discuss the plan.

Following that action a company was formed to begin actual work. De Lesseps was appointed to direct the construction and was also made president of the company. After eight years of little progress it was apparent that operations could no longer be carried on with the available funds, and under French management the enterprise proved unsuccessful. See SUEZ CANAL; PANAMA CANAL.

LESSER ANTILLES, *an til' eez.* See ANTILLES.

LESSING, *les' ing,* GOTTHOLD EPHRAIM (1729-1781), a German literary critic and dramatist, the first of the classic German writers of highest rank. His famous *Letters,* published between 1758 and 1765, give him a claim to the title "Father of German Criticism," and his *Laokoön* (1766), which sets forth his theory of the nature of poetry and painting, worked a revolution in the literary taste of his country. In the field of drama his work was likewise epoch-making in character. His first important play, *Miss Sara Sampson* (1755), is the earliest "tragedy of common life" in German literature, and its publication marked the beginning of a new era in German drama. Lessing's fundamental purpose was to emancipate the national thought and taste from French influences; in this he was supremely successful.

He was born on January 22, 1729, at Kamenz, Saxony. At the age of seventeen he entered the University of Leipzig, where he studied, briefly, theology and medicine. His strong liking for theatrical and literary pursuits, however, caused him to abandon his university career, and, settling in Berlin in 1749, he began his life work as a writer of plays and of literary criticism. In 1760 he accepted a secretaryship under the governor of Breslau, but returned to Berlin in 1765. In that city he published *Laokoön* and *Minna von Barnhelm;* the latter is not only his greatest drama, but was considered the best play produced in Germany up to that time.

After an unsuccessful attempt to found a national theater at Hamburg, in 1770, Lessing became librarian at Wolfenbüttel. There he remained for the rest of his life. Of his later works the most important are a series of essays on dramatic art, called the *Dramaturgie;* also *Emilia Galotti,* a powerful tragedy based on the Roman story of Virginia and Appius Claudius; and *Nathan the Wise,* a philosophical drama inspired by the theological controversies which occupied much of his later years.

LETHBRIDGE, *leth' bridj,* the chief city of the Medicine Hat district, Alberta, and the third city in size in the province. It is situated on the Belly River, in the southern part of Alberta, forty-eight miles north of the Montana state line. Lethbridge is the distributing point for this section and for the lumbering and mining districts of Southeastern British Columbia, and is an important railway center. It is a divisional point on the Crow's Nest Pass branch of the Canadian Pacific Railway, and is the terminus of branches to Calgary, 126 miles northwest, and to Cardston and other towns to the south. Medicine Hat is 101 miles east. Lethbridge was incorporated as a town in 1890 and as a city in 1906; in 1912 it adopted the commission plan of government. In 1911 the population was 8,050; in 1916, 9,437.

Lethbridge is located in a district well adapted to mixed farming; it produces live stock, poultry, grain, alfalfa, wool, clay and an abundance of coal. There is a considerable area of the land tributary to the city irrigated. There are five big coal mines here, employing about 2,000 people. The manufactures include flour, machine shop and foundry products, bricks, boots and shoes. A Dominion experimental farm is located here. The city has a post office, a land office and customs building erected in 1914 at a cost of $300,000, a $100,000 courthouse, a Y. M. C. A. building, a high school and a manual training school. Lethbridge is the district headquarters of the Royal Northwest Mounted Police. J.MC C.

LE' THE, from the Greek word *lethe,* meaning *forgetfulness,* was in ancient mythology one of the five rivers of Hades. Its waters made those who drank of them unmindful of the past. Departed spirits before entering the Elysian Fields drank to forget their earthly cares; those who were to return to the upper world in new bodies drank that they might have no recollection of Elysian joys. The word is used figuratively to denote oblivion or forgetfulness, as in Shakespeare's *Antony and Cleopatra:*

> The conquering wine hath steeped our sense
> In soft and delicate Lethe.

LETTER OF CREDIT. See CREDIT, LETTER OF.

LETTERS, *let' erz,* as a branch of literature, have a peculiar advantage over other forms, in the greater freedom and spontaneity which are possible to them. Not being intended for publication, they may be intimate and private, revealing clearly the personality of the writer

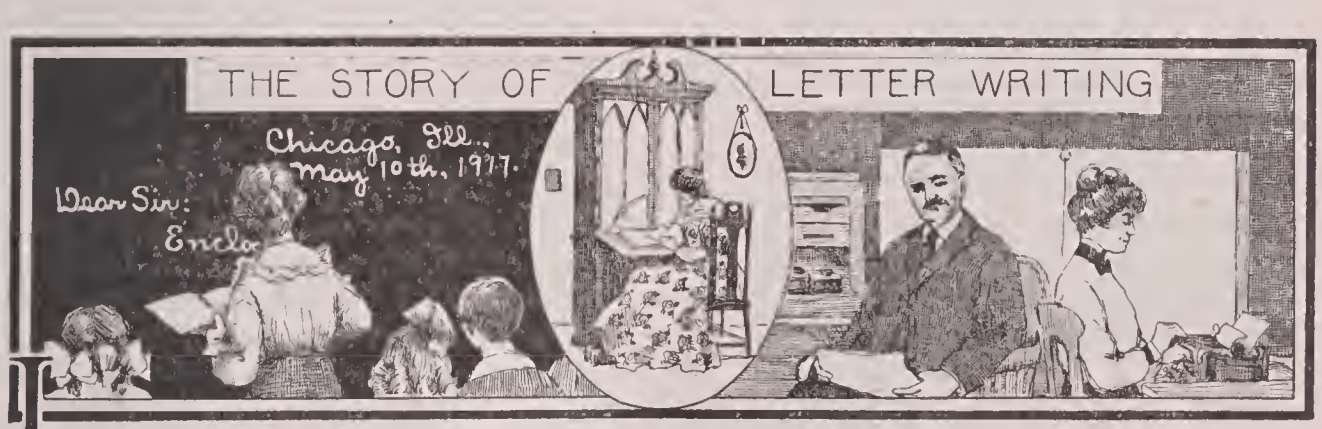
and possessing much of the charm of spoken conversation. The term *epistle* is sometimes applied to more formal productions which are written in letter style, but which are really a setting forth of the author's views intended for publication. This distinction is not always adhered to, however.

Very early examples of letters are extant, among them the famous Amarna Letters in cuneiform characters, but the difficulty of transmission limited such communications to those on topics of the utmost importance. Among the Greeks they became somewhat more common, and the world possesses letters of Socrates, Aristotle and Demosthenes. The personal note was not particularly strong in any of these, but the Romans, notably Cicero, produced letters which approached much more closely the modern manner. All of these ancient letters, of whatever type they may be, are of great value in the study of history and civilization. The Epistles in the Bible are in part personal letters, in part more formal documents.

To those who are interested in the real lives and personalities of famous people, no form of literature is more attractive than the letters which in modern times have been published in large numbers. No one, for instance, can really understand Swift who has not read, along with his bitter satires, the *Journal to Stella*, with its charming and intimate nonsense. Among Swift's contemporaries who wrote notable letters are Pope, Lady Mary Wortley Montague, Bolingbroke and Arbuthnot; Chesterfield's letters to his son, written with the purpose of forming the young man's manners, are remarkable for the ease and grace of their style. Somewhat later, Cowper wrote letters which are among the most charming ever published, their quiet humor making even more pathetic the gloom with which the poet's life was overcast.

In the nineteenth century, special attention was paid to letters, and few indeed were the famous men and women whose correspondence was not published after their death. These letters are, of course, of all styles, those of George Eliot, Lamb, Byron, Dickens, Mrs. Carlyle, Lowell and Stevenson having each a charm of their own. Dickens' correspondence shows a sprightly humor, a keenness of observation and a zest for life as great as is shown anywhere in his novels, while Stevenson's *Vailima Letters* present an inspiring picture of an heroic man working against great odds.

Epistles in verse have been popular at times since the age of Horace, the great master of that form, but these are usually essays or sermons on philosophical or moral topics rather than true letters. In English, Pope made the greatest success with this somewhat artificial form of verse. A.MC C.



LETTER WRITING. Letter writing is the most common form of composition. After leaving school one is seldom called upon to write essays, but scarcely a week goes by when one does not have occasion to write one or more letters. There is not an occupation or a condition of life that does not require the writing of letters.

Underlying Principles. An understanding of the following principles is essential to all good letter writing:

1. *Correct English.* A person will not write more correctly than he speaks, and a knowledge of correct letter writing is impossible without an understanding of correct English forms and idioms and of the rules governing the construction of sentences. The first step in acquiring the art of letter writing is therefore a thorough study of English. For directions for this study see LANGUAGE, subtitle *Steps in the Study of Language;* also GRAMMAR.

2. *Clearness of Expression Depends upon Clearness of Thought.* As one thinks so will one speak or write. Letters containing long, involved sentences are tiresome to read and difficult to understand. Accustom yourself to think clearly and to express your thought in short sentences that follow each other in natural order.

3. *Knowledge is Essential to Expression.* If you are to write a letter that will attract attention you must not only have something to write about but you must know your subject so well that you can present it in a clear and interesting manner. A successful correspondent of a great business house is able to write letters that compel attention because he is master of his subject and because he can express himself in clear and simple language.

4. *Personality.* We write letters because distance makes conversation impossible. Letter writing, then, is talking to our correspondent with the pen. Into no other form of composition does the personality of the writer enter so fully, whether the letter be one of friendship or of business. This is why letter writing is such a fine art. The feelings, thoughts, character and ideals of the writer are revealed through his descriptions and narrations, if the letter is a social one, or in his attitude if the letter is of a business nature. The most charming letters are those in which the personal element is so strong that the writer seems to be at the reader's side telling the story. Ability to inject one's personality into one's letters depends largely upon familiarity with the subject and the facility with which one can express oneself in writing. In this as in other arts practice leads to perfection.

Classes of Letters. Letters may be divided into three classes—social letters or letters of friendship, business letters and formal letters which include notes of invitation and acceptance, etc., and official correspondence. The average correspondent may now and then have occasion to write a formal note, but formal official letters are written only by those holding official positions.

Form of a Letter. Certain conventional forms are in general use in correspondence. These forms have been adopted because they seem best suited to their purpose, and any variation from them is likely to subject the writer to criticism. According to established usage the parts of a letter are the *heading,* the *introduction,* the *body,* the *complimentary close* and the *superscription.*

The Heading. The heading includes the address of the writer and the date. This should be placed in the upper right hand corner. It may occupy two or three lines according to the taste of the writer. In most printed letterheads two lines are used. When three lines are used the street and number should be written on the first, the town and state on the second and the date on the third.

The Introduction. The introduction includes the name and address of the one to whom the letter is written just as they should appear on the envelope, and the salutation, as *Dear Sir; Dear Mr. Blank,* etc.

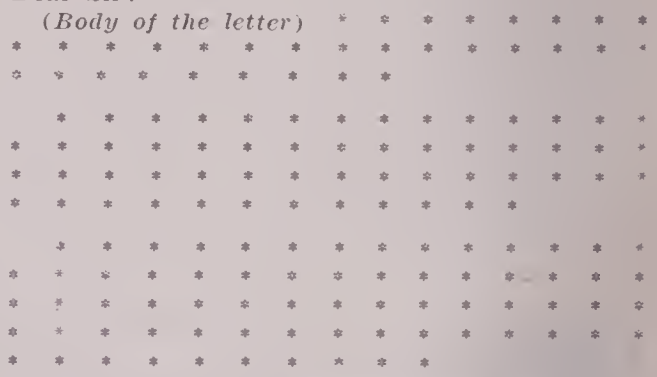
The Body of the Letter. This is the most important part of the letter. "A good letter appeals to the reader in two ways: first, in the mechanical make-up and, second, in the presentation of the subject matter." A letter divided into short paragraphs is more attractive and more easily read than one arranged in long paragraphs. A letter in which simple words and short sentences are used is more easily read and understood than one containing uncommon words and long, involved sentences. The writer should write what he wishes to say in the clearest and simplest possible manner.

(*Heading*)
25 N. State Street,
Chicago, Ill., May 2, 1917.

(*Introduction*)
Mr. James Black,
50 Bromfield Street,
Boston, Mass.

(*Salutation*)
Dear Sir:

(*Body of the letter*)



(*Complimentary Close*)
Very truly yours,
Thomas Ryan.

Complimentary Close. This is used as a matter of courtesy and varies in different classes of letters.

The Superscription. The superscription is the address upon the envelope, and it should be an exact duplicate of the address in the letter, unless the number of the post office box is necessary, or the letter is sent in care of

another person. These directions do not appear in the address. A period should follow abbreviations, and a comma should separate town and state when written on the same line; sometimes no other punctuation is used, but the following is considered the best form:

Mr. Amos Kellogg,
540 N. State Street,
Chicago, Illinois.

The writer should place his name and address in the upper left-hand corner of the envelope. It may be either written or printed.

The model on page 3388 shows the arrangement of the different parts of a letter. This is a good arrangement for all letters except formal notes. The reader is urged to study carefully the punctuation and capitalization of each part.

Social Letters. Social letters form the greater part of most people's correspondence. The more intimate the correspondents are, the less formal letters may be. However, as a means of safety, in case the letter should be missent or lost in the mail, the heading, the introduction and the full name of the writer should each be written in its proper place. The form of salutation may be unconventional when the letter is from one member of a family to another, or when the correspondence is between intimate friends, as, Dear Mother; Dear Sister May; Dear John, etc. When the letter is to one with whom the writer is but slightly acquainted the salutation should be more formal, as, Dear Mr. Brown; Dear Miss Jones. What has been said of the salutation applies also to the complimentary close. In case the writer wishes to close with such an expression as, "Your loving son, Henry," he should write his full name in parentheses under the first signature. This will enable the letter to be returned to the writer should it be miscarried and eventually reach the Dead-Letter Office (which see). Perhaps all the directions that might be given to secure a good letter may best be summed up in this: Write your social letters when you are in the mood for writing; then will your thought flow readily and you will wield a facile pen.

Business Letters. A large volume of business is transacted by correspondence, and the business letter is yearly becoming of greater importance. A man who can write a good business letter has an advantage over his competitor who is a poor correspondent. The former can write convincing letters that hold the attention of prospective customers, while the letters of the latter are hastily glanced at and cast aside.

Suggestions. The suggestions already given relating to the parts and form of a letter pertain to business as well as to social correspondence. Those which follow are especially applicable to business correspondence:

1. The first impression made by a letter is all important. See that your letter is in good form and on good stationery.
2. Be sure that the words are correctly spelled, and that the punctuation and capitalization conform to the rules given in standard authorities.
3. Use correct English and make your sentences short and clear.
4. Make the letter complete. The letter should contain all that is necessary to its understanding without obliging the reader to refer to letters that have preceded it, unless the writer finds it necessary to refer to a special letter of former date.
5. Be brief. While it is necessary that the letter be complete it should contain no unnecessary words and it should pertain to business matters only.
6. Be courteous. Courtesy costs nothing, but it is one of the correspondent's most valuable assets. Courtesy demands that you treat all with whom you correspond as ladies and gentlemen. However discourteous a correspondent's letter may be, your reply should be couched in courteous language. Sometimes it is wise to delay the reply to a discourteous letter until you have had opportunity to consider all circumstances connected with the case, then "put yourself in the other fellow's place," and your reply will doubtless be satisfactory.
7. Be tactful. Tact means ability to discern conditions and to say or do the fitting thing at the right time. Tact is necessary in answering complaints, in making collections and in securing new business.

Use of Titles. Courtesy demands that some title precede the name of a person or a firm in the introduction. No title is used in addressing corporations, as, The Caxton Company, Chicago; D. C. Heath & Company, Boston. The title *Messrs.* is used in addressing firms comprising two or more individuals, as, *Messrs. Thompson and Brown.* In addressing a firm whose members are women *Madames* is used. In addressing a man without a profession usage requires the abbreviation *Mr.* before the name. *Miss* should be used in addressing an unmarried woman, and *Madam* in the salutation of a married woman. This is also an appropriate title for an elderly woman who is single. *Reverend* is the appropriate title for a clergyman. The title of a bishop in the Roman Catholic Church is *Right Reverend* and of an archbishop *Most Right Reverend.* A physi-

cian may be addressed as *Doctor,* or the abbreviation *M. D.* may follow the name, as, *Dr. Henry Johnson,* or *Henry Johnson, M. D.,* but only one title should be used. A person holding an important office or one who has held such an office should be addressed as *Honorable.* In addressing the President of the United States or the governor of a state, *His Excellency* is the appropriate title. The title *Professor* should be used only when addressing a member of a college or university faculty; this title is frequently misused. Abbreviations indicating scholastic attainments when they express something not expressed by the title, as, *Rev. Walter Henderson, D. D., LL.D.; Prof. Albert Harkness, A.M., LL.D.,* may follow the name.

Formal Notes. Formal notes are written in the third person and are not signed. The heading is placed below the body of the note. The following are good models:

Invitation

Mr. and Mrs. James Clark request the pleasure of Miss Abbott's company at dinner on the evening of April fifth, at half-past seven o'clock.
March twenty-eighth.
15 Astor Place.

Acceptance

Miss Abbott accepts with pleasure Mr. and Mrs. Clark's kind invitation for April fifth at half-past seven o'clock.
March thirtieth,
157 St. James Street.

Declining

Miss Abbott regrets that absence from the city prevents her acceptance of the kind invitation of Mr. and Mrs. Clark for April fifth.
Philadelphia, April second.

Consult Barrett's *Business English and Correspondence;* Dwyer's *The Business Letter;* Cody's *Success in Letter Writing;* Westlake's *How to Write Letters.*

Related Subjects. The reader should consult the following articles in connection with his study of this subject:

Abbreviations	Punctuation
Language	Spelling

LETTS, a simple-mannered people of Aryan speech, closely related to the Lithuanians, whom they resemble in physical characteristics. They are light-skinned and have fair hair and blue eyes. They occupy an extensive tract in Russia, including Southern Livonia, nearly all of Courland, the right bank of the Dvina River below Drissa in the government (province) of Vitebsk, and a small portion of Kovno. About 300,000 live in East Prussia, their ancient home, called by them *Borussia.* It was under pressure of the Teutonic Knights, who first brought the terror of the German name to the Letts, that they took shelter in their boglands; from there they were driven out by the Prussians, who took possession of their lands.

The Lettish language is rhythmical and pleasing to the ear, and is not unlike the Sanskrit. The poetry produced by the Letts has the fire and vigor of primitive literature, and it is full of the spirit of the warlike age when they "burnt the strongholds of the Russians," "challenged the Polack to enter their land," or "met the foe on the deep." Again it expresses their hatred for their early oppressors, the Germans and Russians. The Letts live on isolated farms, compact villages being rarely found in their district, and they number from 1,350,000 to 2,000,000. Many have emigrated to the United States, where they are mostly day laborers in large cities, and to Brazil.

LETTUCE, *let'tis,* a small garden plant which is widely used as food, especially in salads. Its native home is not known, but it has been cultivated in gardens in most parts of the world for several hundred years. There are two principal varieties, the *cabbage,* or *head,* lettuce, and the *curled,* or *leaf,* lettuce. The first resembles a head of cabbage, and its leaves are very broad and crinkled. The leaves of the latter are longer and smoother. Lettuce may be whitened, as is celery, by protecting the plants from the light.

LETTUCE
(*a*) Head lettuce; (*b*) loose-leaf, or curled, lettuce.

Lettuce seeds are supplied principally from California. They are planted in a rich, loose soil, early in the spring, and the leaves are ready for the table in about six or seven weeks. Lettuce is grown the year round in hothouses. Market gardeners find it profitable to start the plants in the greenhouse, and after they have made a good beginning, to trans-

FOOD VALUE
The black section represents the proportionate amount of nourishment contained in lettuce. The white area represents the part that has no food value.

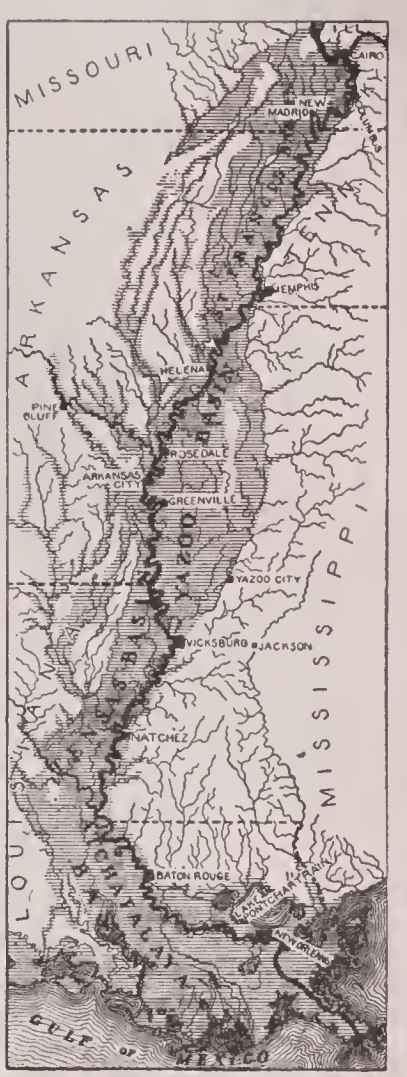
plant them into the outdoor field. The older plants send up a brittle stock filled with a milky, bitter fluid, which bears pale yellow flowers. Though this vegetable is not important for nutritive qualities, yet when eaten raw with vinegar and oil it gives variety to the meal and improves the flavor of other foods.

LEUTZE, *loit'se,* EMANUEL (1816-1868), an American painter, of German parentage, whose work, *Washington Crossing the Delaware,* a reproduction of which hangs in the Metropolitan Museum, New York, is familiar to every American school child. He also painted scenes from the life of Columbus, including *Columbus in Chains* and *Columbus before the Queen.* Among his studies from English history is *Cromwell and His Daughter,* and famous among his numerous paintings depicting scenes from the Revolutionary War are *Washington at Monmouth* and *News from Lexington.* His last work was *Westward Ho,* a mural picture for the staircase of the Capitol at Washington. Another well-known canvas, *Cromwell's Visit to Milton,* is exhibited in the Corcoran Gallery, Washington. Leutze was born at Gemünd, Württemberg, and at an early age came with his parents to Philadelphia, where he received his first instruction in art. For a while he lived at Düsseldorf, but settled in New York City in 1859.

LEVANT', originally meaning *the East,* or the *place where the sun rises,* is the name specifically applied to the coast region and islands of Asia Minor and Syria. It generally designates the coast of the Mediterranean Sea immediately east of Italy, and sometimes is regarded as extending east to the Euphrates and over the Nile Valley, thus including Greece and Egypt.

Levant Morocco, a fine quality of leather made from skins of goats raised in the Levant. Nowhere else in the world is there found such fine quality of skins. While levant morocco should designate leather made solely from goatskins of the Levant, it is a common practice now to call all the finer goat leathers by that name.

LEVEE, *lev'e,* or *le vee'* a wall or embankment built along the banks of a river to keep it from flooding the surrounding country during seasons of high water; the name is from the French word *lever,* meaning *to raise.* In the United States the term is applied specifically to the walls along the lower end of the Mississippi River in the flood districts. The first, which were but three feet in height, were begun in 1718 at New Orleans to keep the river from overflowing a strip of fertile land along its course, and the work on them progressed slowly but steadily. However, the seven states along the "Father of Waters" below its junction with the Ohio soon realized that the undertaking was too expensive for them, and in 1882, the year of a great Mississippi flood, the government set aside $1,300,000 for the improvement of the river, and part of this amount was used for work on the levees. Between that time and 1903 the government gave about $18,000,000 for their construction, but it cost the states in the levee districts over $40,000,000, most of which was raised by local and state taxation.



MISSISSIPPI LEVEE DISTRICTS

The shaded areas show the 20,000,000 acres which are protected by levees built along the banks of the great river.

The earth embankments are usually fifteen feet high, the tops eight feet wide, and the sides slope to a width of thirty feet at the base. At the present time (1917) there are 1,490 miles of levees extending along the Mississippi, but these are still insufficient fully to control the overflow. The Southern river states feel that since the waters which do so much damage are drained from all parts of the central United States, the national government should bear the expense of constructing proper flood protection. See MISSISSIPPI RIVER.

Consult Humphrey's *Floods and Levees of the Mississippi River.*

LEV'EL, an instrument made use of to prove horizontals, used principally by carpenters, masons and other builders, and by surveyors. The *spirit level,* the most accurate,

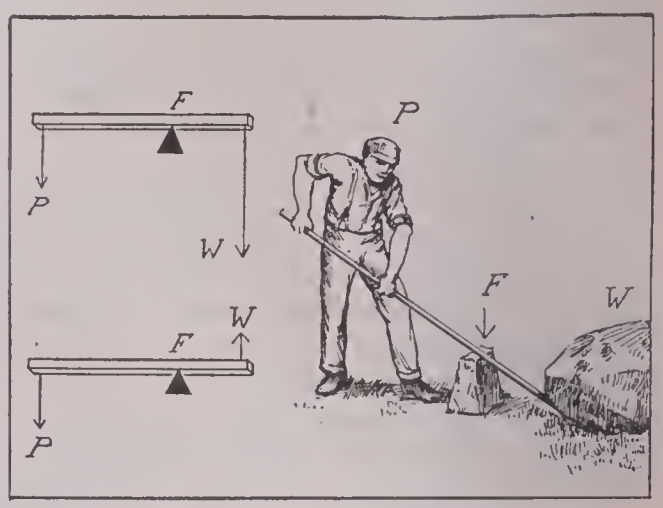
has a bubble of air in a glass tube containing alcohol or some other spirit. The tube is slightly curved upward toward its center, so when the instrument is in a horizontal position the bubble, rising to the highest point, will be exactly at the center. In a carpenter's or mason's level the spirit tube is contained in a wooden bar. A second tube is often placed across the end of the instrument, for testing vertical surfaces. In using such a level it is well to reverse it after the first test, because of possible inaccuracy in its construction. If the bubble is at the center line in both tests, the instrument is reliable. Surveyor's leveling instruments usually contain spirit levels.

An older form of carpenter's level was a plumb-line fastened to a *T*-shaped frame. When the line hung parallel with the stem of the *T*, the crossbar was known to be horizontal.

LEVER, *le'ver,* or *lev'er,* in physics, one of the simple machines by which work is accomplished. It consists of a rigid bar which can be moved about a fixed point, and is illustrated by the familiar seesaw of the children's playground. A plank is balanced across a sawhorse, and a child sits at each end of the board; as the board is set in motion, work is done, for the children move up and down. In this case the support upon which the board rests represents the *fulcrum* of a lever; the parts of the board between the children and the support are the *arms;* the weight at the end which is in the air represents the force used to move the board and is called the *power,* and that at the other end represents the object to be lifted, or the *weight.* The part between the fulcrum and the point where the power is applied is called the *power arm;* that between the fulcrum and the weight is the *weight arm.*

If you multiply the weight by the distance it is moved, you have the amount of work done by the lever (see Foot-Pound). If you multiply the power exerted by the distance it travels in doing the work, you have the same result. It is plain, therefore, that if the power moves a shorter distance than the weight, it must be greater than the weight, but if it travels a longer distance, it may be less than the weight. This principle is what determines the relative efficiency of the three classes into which levers are divided, according to the positions of power, weight and fulcrum. These are explained, as follows:

First Class. Levers of the first class have the fulcrum between the weight and the power, as in the seesaw, crowbar, balance scale, pump handle and catapult. Scissors and pincers are double levers of the first class. If the two arms

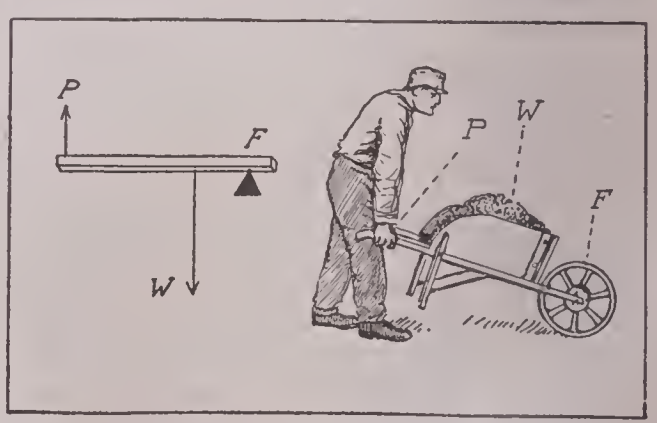


A LEVER OF THE FIRST CLASS

P is the power; *W,* the weight; *F,* the fulcrum. A pump handle and a crowbar may represent the figures at the left, and at the right is shown the mechanical value of the crowbar. If the distance from *W* to *F* is half that from *F* to where *P* is applied, *P* (or the power in pounds) need be only half that of *W* in order to move *W.*

of the lever are equal, the power must equal the weight; if the power arm is longer than the weight arm, as in the crowbar, so that the power travels farther than the weight, the power can be less than the weight.

Second Class. In this division the weight is between the power and the fulcrum, therefore the power always travels a greater distance (as in the wheelbarrow shown in the sketch) and is less than the weight. An oar is another



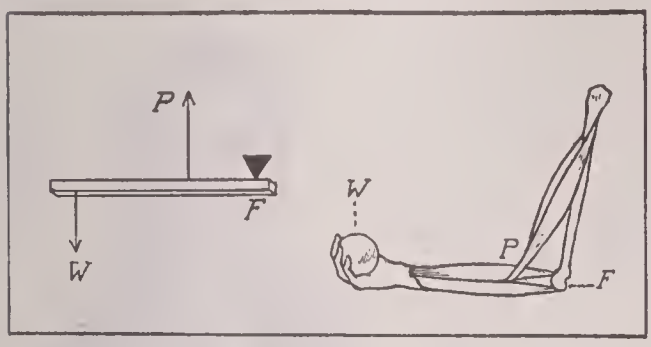
A LEVER OF THE SECOND CLASS

In lifting the weight (*W*) the power (*P*) is always less than *W,* because it is farther from *F* and moves a greater distance.

example; a nutcracker is a double lever of this class.

Third Class. Levers of this class have the power between the weight and the fulcrum. As the positions of weight and power are exactly opposite to their positions in the second

class, the power travels a shorter space than the weight, and must be greater. Examples are sugar tongs (double lever) and the forearm. In the latter case, the fulcrum is the



A LEVER OF THE THIRD CLASS

Here *P* (power applied) must always be greater than the weight (*W*), but speed is gained, for when *P* moves one inch, *W* moves several inches.

elbow joint, and the power is the biceps muscle attached to the radial bone of the forearm close to the joint.

Levers of the first and second classes sacrifice speed to gain power, that is, to do work with less effort; while those of the third class gain speed at the sacrifice of power.

Compound Levers are combinations of two or more levers, whose purpose is greatly to increase the power. By applying the principle of the compound lever it is possible to balance such heavy loads as a ton of hay by just the weight of the hand (see WEIGHING SCALE).

Law of Equilibrium. A lever is said to be in *equilibrium* when the power and weight balance each other. According to the law of equilibrium, *the power multiplied by the length of the power arm is equal to the weight multiplied by the length of the weight arm.* For example, in a lever of the first class which is three feet long and has a fulcrum one foot from the weight end, a power of one pound would balance a weight of two pounds. C.R.M.

LE'VER, CHARLES JAMES (1806-1872), an Irish novelist who wrote many adventurous romances. He was born in Dublin, was educated at Trinity College, afterwards studying medicine at Göttingen, Germany. In 1832 he gained considerable reputation for his skill in the treatment of cholera, which was then prevalent. The first chapters of *The Confessions of Harry Lorrequer* were published in 1834, and were so favorably received that he adopted Lorrequer as his *nom de plume* and thereafter devoted himself to literature. His work was remarkable for vivacity and for happy pictures of Irish manners and life. Between 1840 and 1872 he wrote about thirty novels, among the later ones being *Charles O'Malley, the Irish Dragoon, Jack Hinton, Arthur O'Leary* and *Saint Patrick's Eve.* He was appointed vice-consul at Spezia in 1858 and in 1867 was transferred to Trieste, which consular post he held until his death.

LEVIATHAN, *le vi' a than,* a sea monster mentioned several times in the Old Testament. From the description given of it in *Job* XLI, it is believed to have been the crocodile, but other Scriptural references to it have been interpreted as meaning the whale. Modern usage applies the term to anything of vast proportions. On account of his superb mentality, Doctor Samuel Johnson was called the *leviathan of literature.* A great ocean vessel is commonly referred to in a boasting way by the name.

LÉVIS, *lee' vis,* or in French, *lay vee',* the county seat of Lévis County, on the Saint Lawrence River, directly opposite the city of Quebec. It is served by steamers on the river and by the Grand Trunk, Quebec Central and Intercolonial railways, and has ferry connection with Quebec. Lévis is a picturesque town, high above the Saint Lawrence, and has many interesting old houses. It is also important industrially, for it has a shipyard, tanneries, boot and shoe, knitting and cigar factories. One of its unusual industries is the making of wax tapers. It has the Lorne dock, a government graving dock 445 feet long and 100 feet wide. Lévis is strongly fortified, and is protected by batteries crowning the heights from which Quebec was bombarded in 1759. The town was named for François Gaston, Duke of Lévis (1720-1787), who was second in command of the French troops under Montcalm, and after the latter's death kept up the hopeless fight against the British. Population in 1911, 7,452; in 1916, about 8,000.

LE'VITES, in Old Testament history, were the descendants of Levi, who were selected, probably by Moses, to care for the Tabernacle and its services. They guarded the sacred symbols, administered the rites of worship and transported the Tabernacle and its furniture when the camp moved. When Canaan was divided among the various tribes of Israel no especial part of the land was given to them, for they were scattered in forty-eight towns, thirteen of which were set apart for the priests. During the period of the Judges and the United Kingdom among the Israelites, the Levites reached their highest power as priests, but later the priesthood was restricted to the house

of Aaron (*Numbers* XVIII, 1-7), while the Levites discharged inferior duties about the Temple. They are seldom mentioned in the New Testament.

LEVITICUS, *le·vit'i·kus,* the third book of the Pentateuch, forming with *Exodus* and *Numbers* the literature of the period of the *Exodus,* or the *going out.* It contains the laws of the Israelitish sacrifices, an account of the consecration of the priesthood and a collection of laws known as the *holiness code.* According to modern scholarship, the holiness code shows marks of having been revised at a later date, probably to meet the needs of the period following the Exile. See PENTATEUCH.

LEWES, *lu'is,* GEORGE HENRY (1817-1878), an English philosophical writer and man of letters. Though he was a man of scholarly attainments, it is chiefly through his association with the gifted novelist, George Eliot, that he is of interest to the reader of to-day. He was born in London, and was educated in England and Germany. He abandoned the study of medicine for literature, and in 1845 published his *Biographical History of Philosophy,* which proved his ability as a thinker and writer. From 1849 to 1854 he was literary editor of the *Leader,* and in connection with editorial duties published a *Life of Robespierre,* a summary of Compte's *Philosophy of the Sciences* and *Life of Goethe,* the last winning for him a reputation throughout Europe. His *Studies on Animal Life, Physiology of Common Life* and *Seaside Studies* belong to the period of his investigations in physiology with reference to problems in philosophy. Lewes was also the author of *Problems of Life and Mind* and *The Spanish Drama; Lope de Vega and Calderon,* and he also prepared a number of plays for the stage. Two novels, written in 1847 and 1848, found no permanent place in literature.

In 1854 his association with Marian Evans (George Eliot) began, proving wholly different from his unhappy marriage with Agnes Jervis. There were legal difficulties which prevented his securing a divorce, but so strong was the affection of the novelist for him, and so dependent upon him was she for sympathy and encouragement in her literary work, that she endured the censure of her friends and lived with him as his wife until his death. See ELIOT, GEORGE.

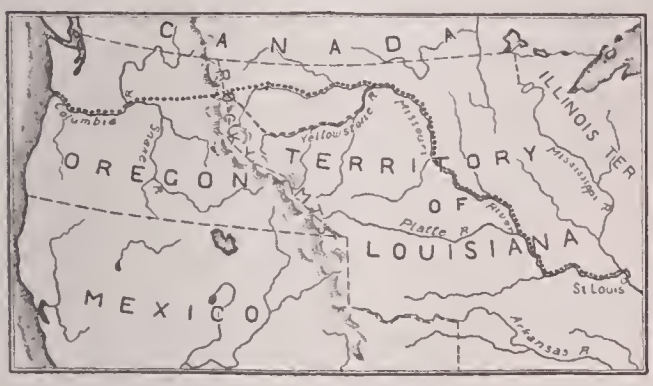
LEWIS, *lu'is,* MERIWETHER (1774-1809), an American explorer, famed as the leader of the expedition which was sent by President Jefferson in 1804 to explore the uncharted wilds of the territory included in the new Louisiana Purchase. Lewis chose as his companion in this undertaking an old friend, Captain William Clark; the results of that famous trip to the New West are stated in the article LEWIS AND CLARK EXPEDITION. Lewis was born near Charlottesville, Va., of a family connected by marriage with George Washington. At the age of twenty he became a volunteer in a body of militia, and on the outbreak of the Whisky Rebellion of 1794 joined the troops which were commissioned by the government to quell the insurrection. Having become an ensign in the regular army, he rose to the rank of captain, and in 1801 was appointed President Jefferson's private secretary.

MERIWETHER LEWIS

Lewis' offer to lead the exploring expedititon westward was gladly accepted by the President, who later paid tribute to the "undaunted courage and firmness of purpose" of the young officer. Congress, in recognition of his services, granted him a tract of 1,500 acres of the public domain. In 1807 Jefferson appointed him governor of Louisiana Territory, with headquarters at Saint Louis, and in this position he showed high ability as an administrator. In 1809, while on his way to Washington, D. C., on a business matter, he was mysteriously slain in the cabin of a Tennessee settler. His untimely death stopped his work on a history of his great exploration. See LOUISIANA PURCHASE.

LEWIS AND CLARK EXPEDITION, an American exploring tour ordered by Thomas Jefferson, President of the United States, after the purchase of Louisiana in 1803. "Let us search out our new country," said Jefferson, "and even that which lies beyond." One band of explorers, commanded by Meriwether Lewis and William Clark, both Virginians, left Saint Louis on May 14, 1804, and went 1,600 miles up the Missouri River. They spent the winter among the Mandan Indians, near what is now known as Bismarck, N. D. Men were sent back with reports to Saint Louis in the

following April, and the expedition pressed on. In September, 1805, the Rocky Mountains were crossed, and the Pacific Ocean came in sight on November 7. After spending the winter on the coast, the party started on its return trip in March, 1806, and arrived in Saint Louis on



ROUTE OF THE EXPEDITION

September 23, after an 8,500-mile journey, to tell a wonder story of the vast continental empire no white men had ever before seen. Much valuable information concerning the climate, geography and animal life of the region was secured. On this expedition was based the claim of the United States that brought the nation eventual ownership of the great Oregon country. The story of Lewis and Clark has been entertainingly told by Parkman in his *Oregon Trail*. See LEWIS, MERIWETHER; CLARK, WILLIAM.

Sacagawea. One woman accompanied the expedition in the most difficult part of its journey, from Bismarck to the coast and back. She was Sacagawea, Indian wife of the party's French-Canadian interpreter. Born among the Shoshonee, or Snake, Indians, in what is now the state of Idaho, she had been captured by another tribe when a young girl and sold to her husband. When the Lewis and Clark party passed through the country in which she had spent her girlhood she was able to render invaluable service, guiding it through the mountains and persuading the Indians of her tribe to furnish horses and give other assistance. A statue to her has been erected in Portland, Ore.

THE SACAGAWEA STATUE

Erected by the women of the United States in memory of the only woman of the Lewis and Clark expedition, and in honor of the pioneer mother of the Oregon country. In *a*, in the illustration, is shown both statue and its pedestal.

Lewis and Clark Exposition, an industrial exposition, also called the AMERICAN PACIFIC EXPOSITION, held in Portland, Ore., in 1905 to commemorate the anniversary of the Lewis and Clark expedition. On May 30, 1903, Congress passed an act to celebrate the exploration of the Oregon country and appropriated the sum of $500,000 for the purpose. Missouri, the state (later) from which the expedition started, appropriated $500,000, and each of the states of the Northwest contributed. Portland was chosen as the site, as it was the point where the explorers spent the winter in 1805; the exposition structures were all reminders of the changes brought about during one hundred years of advancement.

LEW'ISTON, IDAHO, the county seat of Nez Perce County, and the center of a prosperous mining and agricultural district. It is situated on the Idaho and Washington boundary line, 147 miles south and east of Spokane, and is at the head of navigation on the Snake River, at the mouth of the Clearwater River. The city is served by the Northern Pacific Railroad and the Oregon-Washington Railroad & Navigation Company. Population, 1910, 6,043.

Lewiston, though one of the oldest places in the state, is a thoroughly modern town. It is the seat of the state normal school and has the Supreme Court Library, a Carnegie Library, Saint Joseph's Hospital and a United States Weather Bureau station. It is the outfitting point of an extensive mining country, and has important lumbering, fruit-growing, dairying and stock-raising interests. Flour and boxes are manufactured. Lewiston became a city in 1890, and later adopted the commission form of government. J.A.

LEWISTON, ME., an important manufacturing city, situated in Androscoggin County, in the southwestern part of the state, on the east bank of the Androscoggin River, thirty miles from the ocean. Portland is thirty-five miles south. The Grand Trunk, the Portland & Rumford Falls and Maine Central railways serve the city. Electric lines connect with Portland and Brunswick on the coast and with Augusta, thirty miles northeast. In 1770 the settlement was known as the Plantation of Lewiston; it was incorporated in 1795 and chartered as a city in 1861. In population it ranked second in the state in 1916, having 27,809 peo-

ple (Federal estimate); in 1910 it had 26,247. Three-fifths of the people are foreign born; among these French predominate.

Androscoggin Valley, in which Lewiston is located, is a fertile, prosperous country, and the city as its center has an important trade in live stock and grain, but it is distinctly a manufacturing city. A great variety of cotton fabrics is woven in its six large cotton mills, and the three woolen mills produce considerable quantities of blankets, beaver, cassimere and melton cloths. The cotton and woolen mills employ about 7,000 people. In connection with the textile industry the city has one of the most noted bleacheries and dye works in the United States. There are also manufactories of leather belting, machinery for weaving mills, carriages and foundry products. The Androscoggin River at this point has a fall of sixty feet, furnishing plentiful water power, which is utilized by an extensive system of canals and dams. Four steel bridges span the river and connect with the city of Auburn, on the west bank.

Lewiston has a $225,000 city hall, an $85,000 post office, and is the state headquarters of the Shriners. In addition to the public school system there are large parochial schools, a business college and Bates College (Free Baptist), founded in 1863, the first college in New England to open its doors to women. There is also a Carnegie Library. An interesting feature of the vicinity is the Maine Fish Hatchery at Lake Auburn, north of the city. J.L.R.

LEW'ISTOWN, Pa., the county seat of Mifflin County, south of the center of the state, about eighty miles northwest of Harrisburg, the state capital. It is on the Juniata River and on the Pennsylvania Railroad, and is surrounded by a fertile and hilly agricultural country. There are deposits of iron and glass sand in the vicinity, and the city has steel works, foundries, furnaces and manufactories of lumber, flour, silk, edge tools and hosiery. The number of inhabitants in 1910 was 8,166; in 1916 it was 10,733 (Federal estimate).

LEXINGTON, Battle of, the first conflict of the American Revolution, fought on April 19, 1775, at Lexington, Mass., a small town eleven miles northwest of Boston. Thomas Gage had been appointed military governor of Massachusetts, which had been deprived of its charter, and whose principal port, Boston, had been closed by order of the king. Gage's authority was never recognized by the colonists, and the work of arming the colonial militia for defense went steadily on. In the spring of 1775 Gage was ordered to seize John Hancock and Samuel Adams, "arch traitors." On April 18 he mustered 800 men, whom he

MAP OF BOSTON AND VICINITY

ordered to march on Concord, seize the military supplies and arrest Hancock and Adams at Lexington. His plan was at once suspected by the members of the Boston League, one of whom, Paul Revere, rode from Charlestown to Lexington, rousing to arms the country along his route. Longfellow, in *Paul Revere's Ride,* describes this famous episode in graphic language:

> So through the night rode Paul Revere;
> And so through the night went his cry of alarm
> To every Middlesex village and farm,—
> A cry of defiance and not of fear.

When Gage's men reached Lexington they found seventy militiamen confronting them. There the first shot of the American Revolution was fired, and eight militiamen were killed. At Concord the British found the stores removed and a force of 400 men awaiting them. Although the English were reënforced by 1,000 men, they retreated toward Boston, losing 273 of their number.

PARKER MONUMENT
Erected to the memory of Captain John Parker, commander of the "minutemen" at Lexington.

Consult Hudson's *History of the Town of Lexington.*

LEXINGTON, Ky., the county seat of Fayette County, situated northeast of the center of the state, thirty miles southeast of Frank-

fort, the capital, ninety miles southeast of Louisville and eighty miles south of Cincinnati. The Louisville & Nashville, the Chesapeake & Ohio, and the Cincinnati, New Orleans & Texas Pacific railways reach the city, and interurban lines connect with towns north, east and west. The area is nearly five square miles. In 1910 the population was 35,099; in 1916 it was 41,097 (Federal estimate).

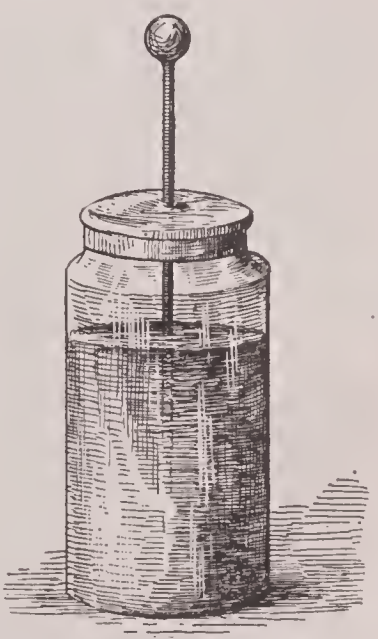
Lexington is located in the famous "blue grass country," which produces an abundance of tobacco and has some of the finest stock farms in the world. The race tracks of Lexington have long been noted. The greatest industrial product is tobacco, and it is one of the city's principal assets, the annual sales amounting to more than four millions of dollars. There are extensive manufactures of distilled and malted liquors, flour, foundry products, carriages, harnesses, saddlery and canned goods and soap.

Owing to its exceptional educational advantages the city is locally called the *Athens of the South;* its institutions include the Kentucky University, Transylvania College, Hamilton and McClelland female colleges, Saint Catharine's Academy (Roman Catholic), the State Agricultural and Mechanical College, the Industrial Home for Negroes and a Carnegie Library. The city also has the state reform school and the state insane asylum, Good Samaritan and Saint Joseph's hospitals and High Oaks Sanitarium. Among notable buildings are the Federal building and the courthouse. There is also a United States Weather Bureau station. Features of interest are Woodland Park and monuments to Henry Clay, John C. Breckenridge and John H. Morgan.

The first settlement was made in 1775 by hunters, who built a cabin to confirm their title to the land. News of the Battle of Lexington reaching them at this time, they promptly gave the name Lexington to their settlement. Four years later a permanent settlement was made, and in 1782 the town was incorporated by the Virginia legislature, as this section was then a part of that state. In 1792 Kentucky became independent of Virginia, Lexington was made the temporary state capital, and the first legislature met here. A city charter was granted in 1832, and the commission form of government was adopted in 1913.

LEYDEN, *li'den,* the birthplace of the distinguished artists Rembrandt, Jan Steen and Gerard Dou, and the seat of what was formerly one of the most celebrated universities in Europe. It is a city of the Netherlands, on the old Rhine River, twenty-two miles southwest of Amsterdam. It is a typical Dutch town, with wide streets, spotlessly clean, and with canals bordered by avenues of trees. Leyden manufactures cloth, cotton, twine, etc., although it is no longer as famous for its textiles as it was during the fifteenth century. It is essentially an educational center, and its university, which once attracted students from all parts of Europe and included in its faculty the greatest names in the world of learning, is still a flourishing institution. In conjunction with it there are an observatory, a museum of natural history, one of the finest of its kind in Europe, and a museum of antiquities. This institution was founded by William of Orange in 1575, as a reward to the citizens for their heroic defense in the siege against the Spaniards in 1573-1574. Population, 1913, 59,500.

LEYDEN, *li'den,* **JAR.** When you hear the loud crackling sparks as a wireless operator makes dots and dashes with his key, electricity is being discharged from a Leyden jar, or electric condenser. But the professors at the University of Leyden, Holland, who accidentally discovered about 1745 that a glass bottle with a nail through its cork touching water inside would store "the electric fluid," certainly never dreamed of such an important use for their toy.

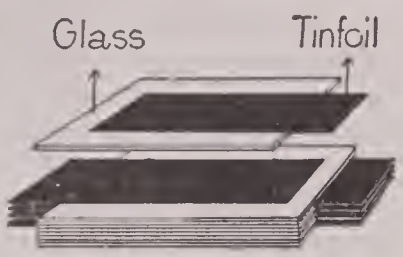


ORDINARY LEYDEN JAR

The usual type of Leyden jar does not contain water, but has a coating of tin foil on more than half of its inner and outer surfaces. The brass rod which passes through the cork is connected with the inner coating by a hanging chain or by springs. If the outer coating is connected with the ground and positive electricity is conducted to the inner side of the glass through the brass rod, the outer side will give off its positive electricity but will retain its negative. If wires from the two are then brought together the electricity is discharged with a bright spark. A

Leyden jar has a definite capacity, depending on the thickness and quality of the glass and the surface of the tin foil; the charge of electricity is not in the coatings, but in the glass itself.

A number of Leyden jars may be connected either in parallel or series (see ELECTRICITY) to form a battery. This is a satisfactory form for small wireless stations, but the battery of Franklin panes is more usual because it occupies less space. It is often enclosed in a wooden box containing oil or wax to prevent leakage of the charge.



CONDENSER FOR WIRELESS TELEGRAPHY

A battery of Franklin panes, so called in honor of Benjamin Franklin.

The spark given off by a condenser is not continuous. If you hit a punching bag it will bound back and forth several times with gradually lessening force. The discharge of electricity from a condenser acts in a similar fashion, the first outward rush being quickly followed by several inward and outward rushes of decreasing intensity, forming the *high frequency oscillations* which are the source of the waves used in wireless telegraphy. The movement in each direction requires from one one-thousandth to one ten-millionth part of a second. C.R.M.

LHASA, or **LASSA,** *lah'sah,* the capital of Tibet and the holy city of the Tibetans, is also known as "the Forbidden City," for no European since 1846 has succeeded in reaching its sacred temples. Lhasa proper is a closely-packed assemblage of stone and brick dwellings and shops, interspersed with many temples. Outside the wall which surrounds the city are about fifteen monasteries scattered through the suburbs and over the plains. Paper, oiled or plain, serves as windows for the curiously-constructed dark houses, the light for which at night is furnished by torches or primitive lamps fed with vegetable oil. The women, who go about with perfect freedom, stain their faces with black spots. Besides being the great religious center of the Buddhist faith, Lhasa is important as a trading center, being the terminus for caravans to and from India, Kashmir, Burma, China, Mongolia and Turkestan. Tea, silks, carpets, rice and tobacco are the chief articles of commerce. The resident population, not including the garrison and the monks, is about 15,000, although this number is greatly increased by a floating population of pilgrims and traders, ranging from 40,000 to 80,000.

LIBAU, *le'bou,* in Russian, LIBAVA, is a fortified Baltic seaport in the southern part of the province of Courland, Russia, near the German border. The city is divided into a new town and an old town. The old town, fortified by the Livonian Knights in 1301, is typical of the Middle Ages, with narrow, crooked streets and tall, dark houses and old walls, but the new town is a beautiful section, with broad streets and fine squares, great business blocks, crowded docks and rows of warehouses. The harbor of Libau is excellent, and for pleasure-seekers there is a good beach. Libau is chiefly important as a naval station and commercial port, for besides its manufactures of farm machinery, flour, arms, sails, ropes and furniture, there is a large inland trade in grain, flax, linseed oil and petroleum. In the German invasion of 1915, Libau, after several bombardments, both by land and by sea, fell to the Germans, who appropriated for their own use the great shipbuilding yards and gun factories (see WAR OF THE NATIONS). Population, 1913, 90,400.

LI'BEL, in law, a false statement expressed either in print or in writing, which tends to reflect on a person's reputation, or exposes him to hatred, contempt or ridicule. Spoken words, however much they may defame, are classed as *slander,* and as they are not so permanent a record as written words, the offense is not so great as in libel. Libel is also considered to show greater enmity on the part of its author. The exhibition of a libelous picture is an act as criminal as a false statement in print. If the libel is seen but by one person other than the person libeled, publication is held to have taken place. In the United States and Canada a libel is ground for civil action in court for damages, and if malicious it is an indictable offense punishable by imprisonment, the term of which is fixed by statute.

LIB'ERAL PARTY, in Great Britain, Canada and Australia, the name of the political organization which opposes the Conservative party. It was the successor in England of the Whigs, and developed rapidly in the colonies, appealing to the people as the party of liberal ideas, supporter of the principle of political freedom and pledged to progressive legislation. About 1850, when the party was assuming definite standards, it was stated, "A Liberal is he who looks forward for his principles of government; a Tory (Conservative) looks backward."

William E. Gladstone was the greatest Liberal leader; later worthy successors have been Joseph Chamberlain, Lord Rosebery, Sir Henry Campbell-Bannerman, H. H. Asquith and David Lloyd George. Since 1855 the Liberals have controlled the English Cabinet considerably more than half of the time.

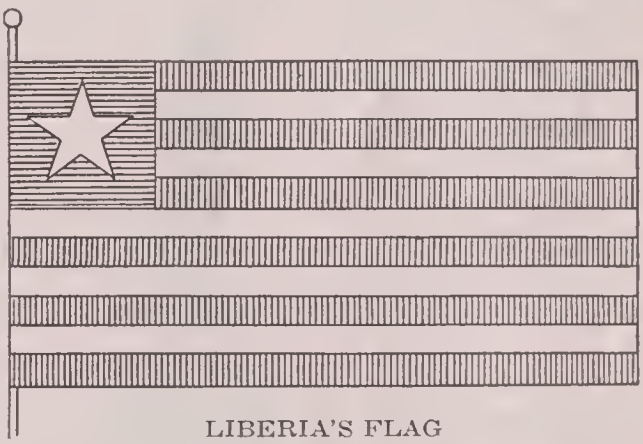
LIBERAL REPUBLICAN PARTY, an American political organization, formed in 1872 as a party of protest against the reëlection of President U. S. Grant. It was composed of seceders from the Republican party, who nominated Horace Greeley for the Presidency on a platform of "universal amnesty and universal enfranchisement," which meant the establishment at once of civil governments in each of the former Confederate states and the removal of all political disabilities imposed on account of the rebellion. The demands of the Liberal Republicans expressed the view of those who were dissatisfied with the administration's severe policy toward the South. In the election Grant received 286 out of 349 electoral votes; the defeat of the new party was so severe that there was no attempt to continue its organization. Mr. Greeley died between election day and the date of the meeting of the electoral college. See POLITICAL PARTIES IN THE UNITED STATES.

LIBERIA, *li be'ri a,* from a Latin word meaning *free,* is a country on the west coast of Africa, the only negro republic in the world, and believed to have the hottest climate known on the globe. The state of Liberia is the result of the efforts of the National Colonization Society of America, organized in 1816, to establish in Africa a colony for free blacks from the United States. The first steps toward organization were taken in 1820; twenty-seven years later the society withdrew active assistance from the negro settlers, urging them to set up an independent form of government. This was done, and a constitution, patterned after that of the United States, was adopted. It provided for a President, Vice-President, Cabinet, Senate, Representatives, Supreme Court, consuls and a standing army. Since then the United States has given Liberia generous financial aid, loaned it colored officers to train its military forces, taken charge of the customhouses, and has stood as a friend, willing to aid or advise whenever necessary.

LOCATION MAP

STREET SCENE IN MONROVIA

The Country. Liberia's area, 35,000 square miles, is about equal to that of Delaware, South Carolina and Rhode Island combined. A narrow strip of coast land, seven miles wide, is the only part developed. The interior is high and fertile, with forests of valuable woods and deposits of rich metals, and gives great promise of future agricultural possibilities. There are two rainy seasons; the warmest month of the year is January.


LIBERIA'S FLAG
Vertical lines are red; horizontal, dark blue; star and alternate stripes, white.

People and Customs. Liberia's population, divided into three classes, consists of 12,000 negro descendants of American freed slaves; 30,000 English-speaking coast natives; and about 1,000,000 half savage blacks who live in the interior. The latter are heathen; many of them are cannibals and all practice polygamy. So far as their relation with the first two groups is concerned, they might as well live in another world. Divided into tribes living in separate villages, each has its own chief, language and customs. In spite of the great natural wealth of the country, its people prefer

trading and military life to agriculture, coffee being the only product that is cultivated extensively. Therefore, as the only source of income is customs duties, the people are usually deeply in debt. Palm oil, palm kernels, rubber and ivory are the chief exports.

In 1913 there were over 200 schools, including Monrovia and Liberia colleges, and several religious institutions. English is the official language of the country, and British money, weights and measures are used. They have numerous churches (most of the civilized natives being Episcopalians) and newspapers and a postal system. White men cannot vote in the republic, and may hold land only with the government's consent. The capital, Monrovia, was named for President James Monroe. M.K.

LIBERTY, Statue of, a colossal bronze statue, executed by Frédéric A. Bartholdi and presented to the United States by France in 1885. It was intended to symbolize the historic friendship between the two republics and to typify the idea of freedom and brotherhood which underlies a republican form of government.

The statue was formally presented to the United States on July 4, 1880, through the American minister at Paris. It was erected on Bedloe's Island, in New York Harbor, and was unveiled in the presence of distinguished representatives of France and the United States, October 28, 1886. The statue represents a proud woman, clad in a loose, graceful robe which falls in generous folds from her shoulder to her feet. The right arm holds aloft a blazing torch. The left hand grasps a tablet on which the date of the Declaration of Independence is inscribed. The head is crowned by a diadem. The allegorical meaning of the work was emphasized for several years by using the statue as a lighthouse at night; the torch in the raised hand of the figure contained powerful lights. "Liberty Enlightening the World" illuminated the path of the sailor in the congested harbor of the second largest commercial city in the world. The light was discontinued when the arm seemed to be weakened, and the stairway to the torch was closed.

The statue cost about $250,000. It is the largest ever made, and the most celebrated example of repoussé work—that is, thin sheets of hammered brass on a framework of iron. Three hundred sheets of brass were used, each between one and three yards square, all weighing eighty-eight tons. The statue is 151 feet in height and from the foundation of the pedestal on which it stands it is 305 feet to the torch. There are 100 tons of bronze contained in the figure, and the total weight is 450,000 pounds. The head will hold forty persons; the torch held twelve people. No one is now permitted higher than the diadem which crowns the head; from this height a magnificent view of the harbor, the city and the New Jersey suburbs is obtained. An elevator carries passengers up the pedestal to the foot of the statue, from which point a closely-winding stair leads to the head. In January, 1917, an explosion on an adjoining island damaged the statue. After repairs were completed electric lights were placed so the great statue could be illuminated at night.

Bartholdi, Frédéric A., who designed the statue, was a native of Colmar, in Alsace. He served in the corps of Garibaldi in the war of 1870 and the following year visited the United States. His second best work is the great *Lion of Belfort,* a figure about 91x52 feet in dimension, which is carved from a block of reddish Vosges stone. Bartholdi understood the requirements of colossal sculpture thoroughly and sacrificed all unnecessary details. His other work includes a statue of Lafayette in Union Square, New York, and a bronze group of Lafayette and Washington in Paris, France, unveiled in December, 1895. He died in Paris, October 4, 1904. M.R.T.

LIBERTY BELL, a relic of the early days of American independence, on which is engraved the words "Proclaim liberty throughout all the land until all the inhabitants thereof," (*Leviticus* XXV, 10). It is now in the hallway of the old State House in Philadelphia. Beside the bell is a printed card bearing this information:

By Order of the Assembly of the Province of Pennsylvania for the State House in Philadelphia. Pass and Stow, Philadelphia. MDCCLIII. This bell

was first cast in England and the inscription put upon it by order of the Assembly of the Province of Pennsylvania in 1752. It broke in ringing after its arrival and was recast in Philadelphia from the same metal, with the same inscription in 1753. It rang on the 8th of July, 1776, to call citizens together to hear the proclamation of the adoption of the Declaration of Independence. In the adjoining yard it rang at each successive anniversary of the adoption of the Declaration until 1835. It broke July 8, that year, while tolling during the funeral solemnities of John Marshall, Chief Justice of the United States, who died in this city.

That old state-house bell is silent,
Hushed is now its clamorous tongue;
But the spirit it awakened
Still is living, ever young.
—ANON.

The dotted line marks a new crack in the Liberty Bell, which is gradually widening and may some day break the bell into two pieces.

The Liberty Bell has been on exhibition at three American expositions: in 1893 it was exhibited at the World's Fair in Chicago, in 1904 at the Louisiana Purchase Exposition in Saint Louis, and in 1915 it was sent across the continent to San Francisco, to be on exhibition at the Panama-Pacific International Exposition. On April 6, 1917, the old bell was lightly struck by Philadelphia officials when announcement was made that the United States was in a state of war with Germany.

LIBERTY CAP, a famous symbol of freedom which appears on certain American coins and on the seals of several Central and South American republics. In ancient Rome a freed slave was given the conical Phrygian headdress, from which the modern liberty cap is copied. Brutus and Cassius used the symbol on coins struck after the assassination of Julius Caesar. At the outbreak of the French Revolution, the *bonnet rouge,* or red cap, was adopted as the badge of "patriots," and Louis XVI was forced to wear it on June 20, 1792, when he was paraded through the streets by the mob which had burst into his palace. It is not certain that the red cap of the French Revolutionists was a revival of the Roman tradition, but its significance is the same.

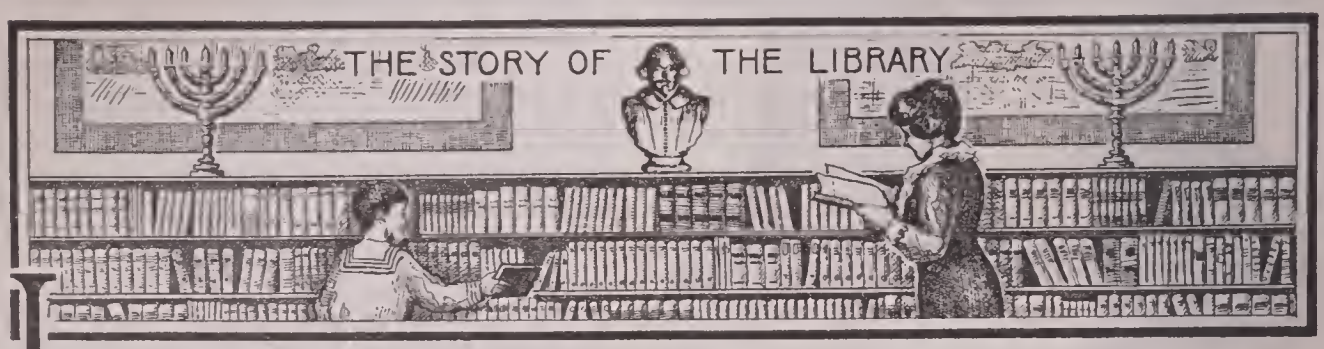
LIBERTY CAP

LIBERTY PARTY, the first organization in the United States to make the slavery question the leading political issue. The opponents of slavery were not united on a policy concerning that institution; some were disposed merely to arouse strong anti-slavery sentiment by special agitation; others, believing that slavery was a political question, were determined to carry the question into politics. The latter faction believed and argued that Congress, by an ordinary statute, had the power to abolish slavery in the territories; but the states, they believed, must decide concerning slavery within their own borders. The leading supporters of this view were James G. Birney, John G. Whittier and Myron Holley (1779-1841), a New York journalist who was at one time president of the American Anti-Slavery Society. Largely through the efforts of these men a convention was held in 1840 at Albany, where Birney was nominated for President. Though called a national convention, most of the delegates were from New York, and in the ensuing election 2,798 of the 7,000 votes given to Birney were cast in New York.

The leaders were disappointed at the showing, but within a year began a more vigorous campaign for the election of 1844. The party, composed mostly of Whigs, was inclined to support Clay until the publication of his letter saying that he would "be glad to see" Texas annexed at some future time. This concession to slavery angered the abolitionists of the Liberty party and led them to renominate Birney, who polled 62,000 votes, enough to defeat Clay and elect Polk. Polk, however, was a Southern Democrat, and was even less acceptable to the Liberty party than Clay. Its leaders wisely saw that they were injuring rather than helping their cause by maintaining a separate organization, and in 1848 all shades of anti-slavery opinion were united in the Free-Soil party. The Liberty party had nominated John P. Hale for President, but he withdrew when the Democrats and Whigs both declined to take a definite stand on the slavery issue. The Liberty party survived for a few years in some of

the Northern states as a local organization, but it was finally absorbed by the Republican party in 1856. See POLITICAL PARTIES IN THE UNITED STATES.

LI'BRA, a Latin word meaning *the balance,* is in astronomy the seventh sign of the zodiac, represented by the symbol ♎, resembling a pair of scales. The symbol probably alludes to the fact that when the sun enters that part of the ecliptic at the autumnal equinox (about September 23) the days and the nights are equal. The term also refers to a constellation included by Ptolemy in his forty-eight groups of stars, which is situated south of the celestial equator and east of the sign Virgo. See ZODIAC; ASTRONOMY; ECLIPTIC.



LIBRARY. The term is derived from the Latin *liber,* meaning *book.* The Latin word *libraria,* however, signified a place where books or written documents were kept *for sale,* and in this sense it has been transferred to the modern languages of Latin origin. In English the primary meaning is a building or room in which books are kept, in some sort of order or classification, for reading or study; secondarily, it means the books. Most commonly the word connotes both together. All other modern languages have followed the usage of the ancients in applying the Greek word *bibliotheke* to this conception.

Libraries may be either private or public. The former are the property of individuals who collect and maintain them for their private use or gratification. Public libraries, with which this article is mainly concerned, are those to which the public is admitted. They may be wholly free, in which case they are often called free libraries, or free public libraries, to distinguish them from subscription libraries maintained by fees or subscriptions of members. The latter are still properly classed as public libraries if their privileges are offered upon equal terms to all. Examples of such are the Mercantile and Mechanics' Institute libraries which flourished in great numbers in the United States and England before the introduction of municipally-supported public libraries fifty years ago. Somewhat analagous are the modern commercial concerns which rent or lend books, generally new novels, for a small fee per day or week or for an annual subscription. The name *book exchange* is commonly applied to them.

College and society libraries are also classed with public libraries, as distinguished from private libraries, especially when, as is generally the case, they extend their privileges to educated and properly authenticated members of the community. Public libraries, both free and subscription, may be either *circulating* libraries, permitting the withdrawal of books for home use, or *reference* libraries, restricting readers to the use of books on the library premises. In the United States most free public libraries are both circulating and reference libraries. There are, however, some notable exceptions, as the library of Peabody Institute, Baltimore; the Boston Athenaeum; Pratt Institute Free Library, Brooklyn, and the Newberry Library and John Crerar Library, both in Chicago, all free reference libraries, and all founded and maintained from bequests or endowments. They are uniformly of a scholarly character, and tend toward specialization in some one or more department of knowledge.

American Libraries. The first library to be established on American soil was that of Harvard University, founded in 1638, six years after the college, and followed in 1700 by Yale. These two are still among the greatest college libraries in America and, in common with most of their type, admit the educated public more or less freely to their shelves. In 1696 the Rev. Thomas Bray was sent from England to Maryland as superintendent of religious affairs, and introduced a number of small parochial or church libraries into the American colonies as an aid to his work. These were open to the public. The Philadelphia Library was founded as a joint-stock company in 1731 by Benjamin

Franklin, who tells the story of its inception in his famous autobiography, and who is called the "Father of the Circulating Library." This was a subscription library and circulated books to its members only, but it extended reference privileges to the general public.

The idea of providing books for free use at the expense of the community by means of taxation originated in America. A town library was conducted on this plan in Salisbury, Conn., as early as 1803, and in 1833 the town of Peterborough, N. H., founded a free circulating library, supported by public taxation, which is still in existence. But the history of the modern American public library properly begins with the adoption of laws by the various states authorizing cities, towns and villages to organize public libraries and to levy taxes for their support. Such a law was first adopted by Massachusetts, in 1848.

In the United States the spread of the public library idea has been rapid and extensive. In 1876 an organization of librarians called the American Library Association was formed in Philadelphia which now has over 6,000 members and holds annual conventions. In most of the states, also, and even in some of the larger cities, there are clubs and associations which meet for consideration of professional problems. These associations have been largely instrumental in promoting professional consciousness and coöperation in the creation of a body of doctrine and practical technique which has been crystallized into a uniform and authoritative system called Library Science. Underlying this is the conviction that the public library is an integral part of public education to which every member of the community, young or old, great or humble, lettered or unlettered is equally entitled. Among the most striking departures from former practice is the growing tendency to allow free access to the book shelves. This is called "open access" and has been widely adopted in the administration of American public libraries.

The modern public library, moreover, has ceased to wait for its patrons to seek it out, but employs means and methods for attracting the public which are both enterprising and effective. Branch libraries are installed in residence districts, often in buildings specially designed for this purpose. The New York Public Library, the greatest free circulating library in the world, maintains, besides a magnificent central building, a chain of forty-two branches in separate buildings erected from a gift of $5,200,000 from Andrew Carnegie. Similar branch systems, though not in every case so handsomely housed, form an important part of nearly every large American public library. Brooklyn has twenty-nine branches; Boston, twenty-eight; Philadelphia, twenty-six; Cleveland, forty; Cincinnati, twenty; Pittsburgh, eight; Chicago, thirty-five; Detroit, eleven; Los Angeles, twenty. Branch buildings are arranged upon a generally accepted plan comprising separate reading rooms for adults and for children, with books on open shelves along the walls or in book stacks easily accessible. Frequently they include halls for meetings of neighborhood societies.

In Canada. The province of Ontario has about 400 public libraries, and this number exceeds the total in all the remainder of the Dominion. The largest is the public library of Toronto, but in 1917 Montreal was organizing a library which was expected to equal in size and equipment the one in Toronto. The Montreal institution is the first one of a truly public nature in the province of Quebec. The War of the Nations, which began in 1914, put at an end for several years ambitious projects to organize libraries in many other Canadian cities.

Carnegie Libraries. The name of Andrew Carnegie is inseparably linked with the growth of public libraries in the English-speaking world during the past twenty-five years. Attributing much of his own success to the influence of the books loaned to him by a citizen of Allegheny, Pa., where he lived as a youth, he began his donations by the erection of a public library in that place, following it shortly by the gift of a splendid museum and library building to the city of Pittsburgh. Many other large cities, among them New York, Philadelphia and Saint Louis, have accepted his benefactions, while thousands of smaller places in America and in Great Britain and her colonies bear testimony to his generosity in the public libraries made possible through his aid and, in many cases, bearing his name. Up to the end of 1915 the total amount of his grants to public libraries was nearly $65,000,000. See Carnegie, Andrew.

Librarianship as a Profession. The administration of a modern public library is now recognized as a specialized occupation or profession requiring training, experience and a high degree of executive ability, while the several branches of the work call for special skill, learning and scientific accuracy. One of the

most intricate of these specialties is that of the classification of books, that is, their grouping by subjects, and the application of some plan of numbering or notation indicating the proper location of each book with reference to all others in the same class.

Several highly ingenious and practical systems of classification have been devised, two of which are in general use in American libraries. The *decimal classification,* compiled by Melvil Dewey, and first published in 1876, is the most widely used. The ninth edition is now extant, and constant revision and addition keeps it abreast of scientific progress. It is based on an arbitrary division of the field of knowledge into ten main classes, capable of indefinite subdivision by means of figures and the decimal point. It possesses elasticity, adaptability and mnemonic qualities rendering it applicable to the largest as well as the smallest collection of books. The *expansive classification,* devised by Charles A. Cutter, is more complex and fuller in its schedules, and is, perhaps, better adapted to the needs of large scholarly collections such as university and reference libraries. Cataloguing is another branch of librarianship which demands a large measure of scholarship, expertness and accuracy. A number of manuals cataloguing rules have been issued, the first American compilation being the *Rules for a Dictionary Catalog,* by Charles A. Cutter, mentioned above, published by the United States Bureau of Education in 1877. Known as "Cutter's Rules," this is still the leading authority and forms the basis for all subsequent American codes.

Librarianship as a profession, in its functions, duties and emoluments, closely parallels that of the teacher, and is enlisting in its ranks a steadily growing number of men and women of high character, ability and education. For women, especially, the opportunities for useful and congenial employment are very promising. In the thousands of small and medium-sized public libraries of America most of the positions, including that of chief librarian, are filled by women. In the largest institutions, and those of special grade, the chief administrative offices are usually occupied by men. There are now ten professional schools for training librarians, the pioneer and still the leading institution being the New York State Library School at Albany. Other schools, usually affiliated with a university or a large library, are the New York Public Library School; Pratt Institute, Brooklyn; Simmons College, Boston; Syracuse (N. Y.) University; Western Reserve Library School, Cleveland; Southern Training School, Atlanta, Ga.; University of Illinois Library School, Urbana, Ill., and Wisconsin State Library School, Madison.

In a number of these schools the completion of a general college course or its equivalent is necessary for admission, while most of the others require at least two years of college work or equivalent educational credits before entrance. Personal qualifications, temperament, disposition and general adaptability of applicants are also taken into account. The course extends over two years, combining theoretical instruction with much practical work in libraries of various kinds. Several of these institutions confer the degree of Bachelor of Library Science. The Carnegie School for Children's Librarians, with a two-year course wholly devoted to that specialty, is conducted as an adjunct to the Carnegie Free Library of Pittsburgh. Entrance requirements are similar to those indicated above.

Library Commissions. Thirty-seven states of the Union now have, as a part of the state government, boards or commissions for the advancement of library interests. These commissions are composed of three or five members serving without pay, and a staff of salaried executives who devote their energies to promoting the establishment of new public libraries, the improvement of conditions in existing libraries, the circulation of traveling libraries in rural communities, maintenance of summer schools (in Wisconsin and Indiana of a fully organized library school) and other measures for the extension and development of library facilities throughout the commonwealth.

National Libraries. The great national libraries of the United States, France and Great Britain are described in the articles LIBRARY OF CONGRESS, BIBLIOTHÈQUE NATIONALE and BRITISH MUSEUM. Other notable national libraries are the Imperial Public Library at Petrograd, the Imperial-Royal Library at Vienna, the royal libraries of Berlin, Munich, Stockholm, Copenhagen, and the Biblioteca Nazionale Centrale at Florence. Record must be made here of the magnificent Library of the Vatican, first in the importance of its contents and sheer wealth of its possessions. Founded in 1447 by Pope Nicholas V, and housed in the most sumptuous library quarters in the world, it contains, besides the secret Papal archives, a staggering profusion of ancient Biblical and classical manuscripts and other book rarities

such as have not been brought together elsewhere. Its printed books number 250,000 volumes and its manuscripts over 40,000. C.B.R.

See the articles READING and LITERATURE for lists of books suitable for reading by boys and girls and their fathers and mothers and by teachers. For books relating to the subject *Library*, consult *Special-Report on Public Libraries*, issued by the United States Bureau of Education: Adams' *Public Libraries and Popular Education*: Dewey's *Decimal Classification and Relative Index*.

LIBRARY OF CONGRESS, now the third in size among the world's libraries, was established in 1800 in Washington, D. C., and designed for the use of members of the United States Congress. While it is maintained to serve its original purpose, the present use of the building and contents is largely by others than Senators and Representatives. The library was at first housed in a room of the Capitol, but so rapid was the accumulation of material that several times it outgrew enlarged quarters that were there provided; in 1897 it was removed from the Capitol to a special building which was begun in 1889 and completed in eight years at a cost of $6,500,000. The location of the Congressional Library is east of the Capitol; it covers a ground area of nearly four acres, and has more than eight acres of floor space. For the convenience of members of Congress a subway connects the library and the Capitol, and an endless chain system conveys books to and from the halls of legislation.

In 1814, when the Capitol was burned, the library was destroyed. Congress established it anew by the purchase of the library of Thomas Jefferson, comprising 6,760 volumes, for which it paid $23,950. In 1851 fire again destroyed nearly the entire collection, 35,000 volumes being lost. Since then Congress has made regular appropriations for its development. Under the copyright laws since about 1860 the library has received two copies of every publication in the world for which copyright protection in the United States has been requested. It has also received gifts of rare and beautiful books. In 1916 the library comprised over 2,390,000 books and pamphlets, about 30,000 manuscripts, 60,000 charts and maps, almost 400,000 musical compositions and about 100,000 engravings and lithographs.

The library is in charge of the Librarian of Congress, who is appointed by the President and confirmed by the Senate; he receives a salary of $6,500 per year. Under him is a staff of trained officials such as one of the world's greatest libraries requires. The service to the public is in the highest degree efficient, and the routine is much like that employed in any great city library, except it is on a larger scale and that no books or documents may be taken from reference and reading rooms except by members of Congress and government officials. Access by the public to any book published is made easy through intelligent attendants.

The building is the most magnificent structure of the kind in the world, and is unequalled in the United States in beauty of interior decoration. E.D.F.

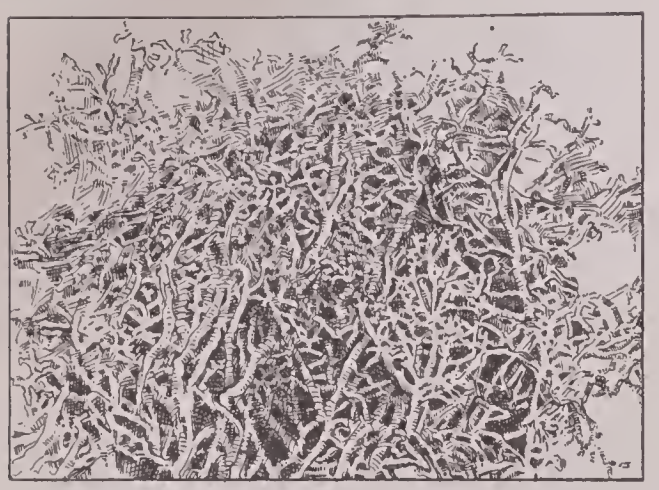
For details of the world's largest libraries, see BIBLIOTHÈQUE NATIONALE; BRITISH MUSEUM. See, also, the article LIBRARY.

LICENSE, *li'sens,* a formal permission given a person by the proper authority to engage in a business or to do certain things which, without that authority, would be unlawful. In most cases the privilege is granted on the payment of a fee. Licenses are issued principally for the safeguarding of the public rights, for the purpose of obtaining revenue, or for both reasons, and they may be revoked by the proper officials if the terms on which they are granted are not observed. There are many callings which directly affect the health, morals or general welfare of the community, and it is therefore necessary that the state or municipality should regulate the number and qualifications of persons engaged in such callings. For this reason, dentists, physicians, pharmacists, undertakers, school teachers, lawyers, etc., are required to hold licenses in order to carry on their chosen vocations.

Owners of theaters and other places of public amusement, street peddlers and owners of automobiles are also required to procure licenses. Automobiles are a direct source of expense to the community in that they increase materially the wear on public highways, and a license fee upon such vehicles is considered justifiable; such licensing also assists in identification in case of reckless driving which may result in accidents. The granting of saloon licenses has become a matter of widespread public interest. A considerable number of people favor the regulation of this business by means of a *high license,* which tends to restrict the number of saloons. The advocates of *low license* favor a small fee, to be levied for revenue only. Another group, the *prohibitionists,* do not believe it necessary for the government to derive a revenue by licensing saloons, and

favor the abolition of the liquor traffic. See LOCAL OPTION; PROHIBITION.

LICHENS, *li'kenz,* strange and beautiful flowerless plant formations which, needing no soil, grow on and adorn bare rocks, tree stumps



REINDEER LICHENS

and waste places. They are usually dry, and most of them crumble easily when touched. Ruskin describes them as—

> Meek creatures; the first mercy of the earth, veiling with hushed softness its dustless rocks; creatures full of pity, covering with strange and tender honour the scarred disgrace of time.

Lichens of gray, yellow, brown, greenish, blue or black color are found the world over, from the frozen north to the tropical south, from the beaches to loftiest mountain peaks. Probably 4,000 species have already been described.

Lichens are combinations of algae and fungi (see ALGAE; FUNGI). In this unique plant-partnership the alga furnishes the food and the fungus protects the alga from the sun's rays and absorbs water for its companion. Lichens have neither roots, stems nor leaves, but have layers of variously-shaped expansions called *thalli.* According to structure they are classed as *foliose,* or leaflike, the kind which creeps over fence-rails; *crustaceous,* or shell-like, the form which paints big rocks with delicate patterns in grays and greens; and *fruticose,* or shrublike, that class which, mosslike, beards trees, or clusters on barren ground.

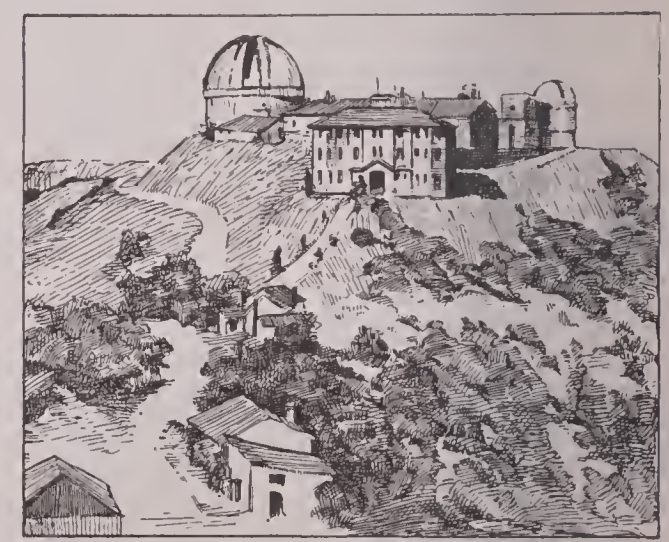
According to one accepted theory of lichen growth, a fungus spore is carried on the winds and finally lodges on a group of alga cells with which it can live. Both spore and cells continue to grow, thrive and reproduce. Being so constructed that all they need for survival is the moisture they can gather from the air, lichens can thrive where every other form of vegetation must perish.

Uses. Lichens not only make their chosen places of abode more beautiful, but they help pave the way for other forms of life. Growing as they do upon exposed rocks and in barren soil, they secrete an acid which dissolves the rock and softens the soil, and in time when they decay and mix with the soil, they enrich it so that more highly-developed plants can grow there.

Some lichens containing quantities of starch are valuable articles of food for man and beast. Iceland moss and reindeer lichen, which grow abundantly in Northern regions, not only form the principal food for reindeer, but both have been used as food for man. The manna of Scripture is supposed to have been a species of lichen. Some species furnish dyes, one of the best-known of these being the litmus of commerce, so extensively used in chemistry (see LITMUS). Years ago lichens were used as drugs.

E.D.F.

LICK OBSERVATORY, an observatory conducted by the department of astronomy of the University of California, is on Mount Hamilton, of the Coast Range, 4,285 feet elevation. The observatory is about twenty-six miles east



LICK OBSERVATORY

of San José and was completed in 1888. It was named for James Lick, a California millionaire, who left the sum of $700,000 for its erection and equipment (see below). The telescope is the second largest one in the world, with a refracting lens of thirty-six inches and a focal length of over fifty-six feet. It is only surpassed by the forty-inch telescope of the Yerkes Observatory at Lake Geneva, near Chicago. The dome and observation platform are moved by water power, and the telescope tube has a point of suspension thirty-six feet from the floor. Among its modern appliances

is an intricate device for recording earthquake disturbances.

The site was selected on account of its clear atmosphere, and here many notable eclipses have been observed. In 1892 at Lick the fifth moon of Jupiter was discovered by Barnard, and a search for new stars and comets is systematically prosecuted. Visitors are freely admitted, and methods of work are explained, and in this way an impetus is given to popular education.

James Lick (1796-1876), an American capitalist who founded the observatory that bears his name, was born in Fredericksburg, Lebanon County, Pa. He became a manufacturer of pianos in Philadelphia, and from 1821 to 1847 was in the same business in Valparaiso and Buenos Aires in South America. In 1847 he settled in California, invested largely in real estate, and accumulated a vast fortune. In 1874 he placed the sum of $3,000,000 from his estate in the hands of seven trustees to be devoted to charitable and specified uses, and a year later he increased the amount to $5,000,000. His principal bequest was to the University of California for the erection of an observatory which was to contain the world's most powerful telescope at that time. A large sum was also appropriated for three groups of statuary to be placed before the city hall in San Francisco to represent three important periods in the history of California.

LICORICE, or **LIQUORICE,** *lik'o ris,* a hardy herb of the pulse family, which grows about four feet high and bears long, sweet roots that give it great commercial value. It is found in Southern Europe and Asia. Licorice grows wild in damp places, and is usually regarded by ignorant natives as a worthless weed. By pressing the root, a thin, yellow fluid is obtained which is used in medicine, especially in the treatment of bronchial troubles. The commercial article is made by evaporation of the extract which is boiled from the roots. The Syrians make a business of pulling, drying and packing licorice. The roots grow from two to three feet long and are pulled in the damp season in October, left stacked to dry for nearly a year, then pressed into bales for export. Licorice is used to add flavor to port wine and tobacco, also in the manufacture of beer and in making cough drops, candy and chewing gum.

LICTORS, *lik'torz,* in ancient Rome, the official attendants who were appointed to enforce due respect for the chief magistrates and fulfil the commands of the latter. The number of lictors depended on the magistrate's rank. A dictator, when appearing in public, was preceded by twenty-four lictors; a consul by twelve, a propractor by six, and a praetor by two. The lictors carried axes tied in bundles of rods called *fasces,* as an ensign of office. The duty also devolved on the lictors of inflicting punishment on Roman citizens who had been condemned. In later times fasces were carried before the emperor. See FASCES.

A LICTOR

LIEBIG, *le' biK,* JUSTUS, Baron von (1803-1873), one of the most celebrated chemists of the nineteenth century, regarded as the founder of organic chemistry. His *Chemistry of Food* brought about a more rational method of preparing and using food, and his application of chemical principles to soils and manures greatly advanced the science of agriculture.

He was born in Darmstadt, Germany. His paper on *Fulminic Acid,* written while he was studying in Paris, attracted the attention of Alexander von Humboldt and led to his appointment as professor of chemistry at Giessen, where he labored for more than a quarter of a century. He was raised to the rank of baron by the Duke of Hesse, and other honors were heaped upon him. He became professor in the University of Munich in 1852, and in 1880 was appointed president of the Munich Academy of Sciences.

Liebig labored successfully in all branches of chemistry, but particularly in organic chemistry, making many discoveries in that department and doing much toward improving the

methods of analysis. His *Chemical Letters,* published in 1852, have been translated into nearly a dozen languages and are among the most valuable contributions to chemical literature written in modern times.

LIECHTENSTEIN, *leeK'ten schtine,* the smallest independent state in Europe, with the exceptions of Monaco and San Marino. It lies between Austria and Switzerland, extending along the right bank of the Rhine, and covers an area of about sixty-five square miles, a little greater than that of the District of Columbia, or a third of that of the city of Chicago. Except in the western part it is mountainous. The chief industries are agriculture, stock raising, weaving, wood carving and wine making.

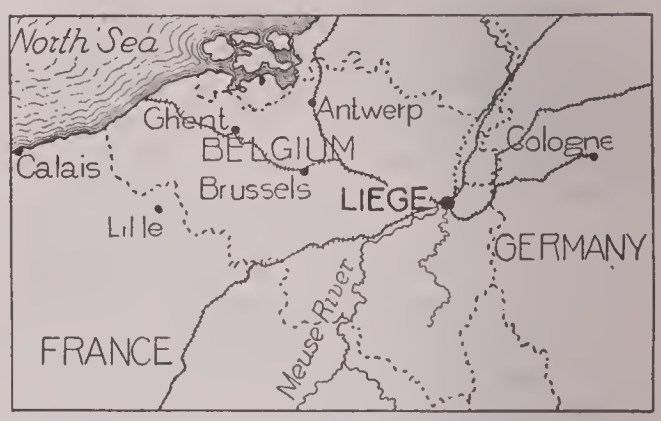
LOCATION MAP

The triangular black area between Austria - Hungary and Switzerland is Liechtenstein. The body of water to the north is Lake Constance.

It is governed by a prince descended from free barons who became princes of Liechtenstein in 1608. The government is constitutional. All males of twenty-four years of age are voters, and they elect a Diet (Congress) of twelve members, who retain their seats for four years. Previous to 1868 military service was compulsory. The state has no public debt, and the revenue usually exceeds the expenditure. It belongs to the Austrian Customs-Union, and is practically a part of Austria-Hungary. The capital is Vaduz, a town of 1,100 people. The language spoken since the seventeenth century is German. The total population is about 10,000.

LIÉGE, *le ayzh',* in the center of the East Belgian coal-mining district, and formerly one of the most important manufacturing cities of Belgium, is situated fifty-four miles southeast of Brussels, on both banks of the River Meuse. It is the the capital of the province of Liége. Its ring of twelve forts, six on each side of the river, and crowning the hills which surround the city, offered the first real resistance to the forces of the Germans in their memorable invasion of Belgium in August, 1914 (see WAR OF THE NATIONS), and the news of its capture told the world that the brave little country was doomed to fall before a foreign foe. At the time of its surrender Liége was garrisoned by 40,000 soldiers, but the invading army outnumbered the Belgian forces two to one.

The city was a valuable prize of war not only because of its strategic situation and its arsenal, but because it was Belgium's chief center for the manufacture of railroad equipment and firearms. Over 20,000 workmen were employed in the manufacture of firearms alone, and there were besides large zinc foundries and factories for the making of watches, gold and silver articles, mirrors, cloth, leather and paper. Liége suffered greatly from the heavy bombardment to which it was subjected. Before the War of the Nations it was an attractive city of handsome squares, fine public buildings



LOCATION MAP

and stately churches. Its university, founded in 1817, had an enrolment of nearly 3,000 in 1913. Population, 1912, 170,630.

LIEN, *le'en,* or *leen,* in law, is a claim or legal hold which one person has upon the property of another as security for debt. In cases where real or personal property is charged with an obligation to pay, every such charge may be designated a lien, but a lien is not a title to the property. Liens are of two kinds, *specific* or *general.* A *specific,* or *particular,* lien is one in which a person in possession of goods may hold them until a claim which he holds is satisfied. It may be also held against certain personal property for a debt arising from materials furnished, or for work done upon it. This is the most common form of a lien. A *general* lien is one upon property for a general balance due from the owner.

LIEUTENANT, *lu'ten ant,* in most modern armies and navies an officer who assists his superior and commands in the latter's absence. In Germany he is called *leutnant;* in Italy, *tenente;* in Spain, *teniente.* In both the American and Canadian armies the *first* and *second lieutenants* rank first and second below captains. In the British navy the lieutenant is next below a commander; in his first eight years of service he ranks with an army captain, afterwards with a major. In the United States

navy a *lieutenant-commander* is next to a commander and ranks with a major; a *senior lieutenant,* the next in grade, ranks with an army captain; a *junior lieutenant* ranks with an army lieutenant.

In Canadian and American armies a *lieutenant-colonel* is below a colonel and above a major. The grade of lieutenant-general usually exists in the United States only in war time.

In the United States army the pay of a lieutenant-colonel ranges from $3,500 to $4,500 a year, the maximum being reached after twenty years of service; that of the first lieutenant ranges from $2,000 to $2,800, and of the second lieutenant, from $1,700 to $2,380. In the navy lieutenant-commanders on shore duty receive from $3,000 to $4,000 a year, and those at sea from $3,300 to $4,400. Senior lieutenants have corresponding salaries ranging from $2,400 to $3,360; and from $2,640 to $3,696. Junior lieutenants receive from $2,000 to $2,800 while on shore duty, and from $2,200 to $3,080 while at sea. See RANK IN ARMY AND NAVY.

LIEUTENANT-GOVERNOR, in Canada, the executive head of a province, and the direct representative of the Crown in provincial government. He is not elected by the voters, as are the governors of states in the American Union, but is appointed by the Governor-General in Council. He has, therefore, the double character of an officer of the Dominion as well as of the province, just as the Governor-General is an officer of the Crown and of the Dominion. In his official acts the lieutenant-governor follows the rules and usages which govern the relations of the Governor-General and his advisers. He appoints his executive council, or Ministry, and is guided by their advice so long as they retain the confidence of the legislature. He summons, prorogues (that is, adjourns) and dissolves the legislature, makes appointments to office, and generally performs all executive acts necessary for the government of the province. He usually serves for five years, but he is subject to removal by the Governor-General for "cause assigned," which means that the reason must be given to the Dominion Parliament. In Ontario and Quebec the lieutenant-governor receives a salary of $10,000 a year; in Prince Edward Island, $7,000; in each of the remaining provinces, $9,000.

In the United States. The lieutenant-governor of a state of the Union occupies a position analogous to that of the Vice-President of the United States. He presides over the state senate, and succeeds to the office of governor in case of the death or permanent disability of the latter. During temporary disability or absence of the governor from the state he becomes acting governor.

LIFE EXTENSION. There lived in Venice five hundred years ago a Count named Cornaro. Although during his life few people realized that he was remarkable, now, five centuries later, we know that he was in his way a great man. His fame will probably live forever. Cornaro was born a nobleman in rank. But this does not mean that he was what might be termed a nobleman in body. As a child he was sickly. He suffered ill health all during his early manhood, and before he was forty the doctors gave him up to die.

But Cornaro was really a nobleman in mentality and character, and when he found himself at so young an age facing the end of his life, having in no degree attained his manly ambitions, he began to meditate, sick as he was, upon the nature of his condition. Out of that meditation Cornaro evolved a new sense of how to live, and we who are born in the twentieth century are still reaping the benefit of Cornaro's discoveries. Instead of dying at forty, Cornaro, as a result of his discoveries regarding the rules of hygienic living, and because of the force of his will and character in putting them into effect, extended his life to the century mark. He did not simply extend, for sixty years, his feeble life of forty. He converted that life—of a "despairing and helpless invalid, unfit for either work or enenjoyment"—into a healthy, happy and prosperous one. He attained mildness and sweetness of disposition, gaining thereby respect and affection, and he retained his rugged health and vigor and the full possession of his mental faculties until the end of his remarkable career.

The principles of hygiene by which Cornaro so extended his life often have been re-discovered by modern science, and since Cornaro's time there have been many famous examples of life extension—which does not mean adding a few years to feeble old age, but adding to the years of youth and strength and postponing the years of senility—if indeed the years of comparative youth cannot be retained to the end. This means, of course, that life lengthened is broadened, in usefulness and enjoyment.

Since, however, "what is one man's meat is another man's poison," it is always advisable to have a periodic medical survey made of the

entire body, in order to ascertain the strength and weakness of special organs and obtain an intelligent basis of procedure in hygienic living; for all are not constituted alike, and indeed many are carrying about physical defects which require special action and consideration.

Few people realize the great extent to which such physical defects and impairments exist and the importance of discovering them at as early an age as possible. The work of the Life Extension Institute, Inc., of New York City, among thousands of individuals, ranging from infants to aged men and women, has revealed the fact that the health of hardly any individual is perfect, and that even some young boys and girls already show conditions which should exist only in old people. The importance, therefore, of beginning these periodic medical inspections at the earliest possible age, so that beginning defects and impairments may be detected and checked at once, if possible, can hardly be over-emphasized. The following table shows the percentage of impairments found in a group of especially well-cared for young men and young women:

ANALYSIS OF PHYSICAL EXAMINATION OF 1,000 INDUSTRIAL WORKERS (FOREMEN AND SKILLED WORKERS) IN A LARGE DETROIT MOTOR COMPANY, AND COMPARISON WITH THE RESULTS OF 1,000 EXAMINATIONS OF EMPLOYEES OF BANKS, TRUST COMPANIES, AND COMMERCIAL HOUSES IN NEW YORK CITY.

	Detroit Motor Co. industrial	*New York commercial.*
Employees	1,000	1,000
Average age ..... years	32.7	27
Perfect on examination. No physical impairment found, and no advice for correction of living habits needed ..... per cent.	00	1
Imperfect on examination. Advice needed regarding physical condition or living habits ..... per cent.	100	99
Advised to seek medical treatment ..... per cent.	69	81

(Of those referred to physician, there were aware of impairment in each group only about 10 per cent.)

Those found imperfect, either in physical condition or manner of living, were classified as follows: (These percentages refer to individuals, and are of the total number examined.)

	Per cent.	Per cent.
Minor.—		
Advice needed regarding living habits or physical condition, but immediate treatment not required	31.1	17.7
Moderately impaired.—		
Referred to physician for treatment and report sent to physician	22.9	18.5
No physician, or none mentioned. Urged to seek medical treatment or guidance	39.9	58
Seriously impaired.—		
Referred to physician for treatment and report sent to physician	3.6	2
No physician or none given. Urged to seek medical treatment	2.5	2.8

ANALYSIS OF IMPAIRMENTS.

These percentages are of the total number examined. As many had several impairments, the total of the percentages exceeds 100. In other words, these percentages are not mutually exclusive, but overlap.

	Per cent.	Per cent.
Moderate to serious.—		
Organic heart	3.5[1]	16.2
Moderately to serious thickened arteries (radials, brachials, and others)	24.65	42.4[2]
Slightly thickened arteries (chiefly radials)	29	
High or low blood pressure	23.1	26
Urinary—albumin, sugar, casts.	45.6[3]	39.8
Combined urinary and other serious impairments	26.6	24
Total urinary and circulatory impairments	72.3	
Nervous	.3	1.1
Lungs	5.7	2.9
Minor to moderate.—		
Functional circulatory — rapid, slow, irregular pulse	21.6	14.8
Minor urinary — indican, bile, crystals, etc.	26.6	20.8
Digestive disturbances	9	7.3
Constipation	14.7	17.2
Nose, throat, respiratory	42	28.5
Ears	30.3	20.3
[5]Teeth and gums	69.5	47.8
Anemia	.4	2.7
Skin	6.8	9.1
Errors in diet	54.1	59.8
Errors in personal hygiene	50.5	54
Physical defects:—		
Faulty vision, not fully corrected	41	31.1
Flat foot	2.3	4.3
Faulty posture	18.1	17.7
Rupture, no truss	2.4	1.8
Overweight (25 per cent.)	12.8	3.2
Underweight (25 per cent.)	7.7	15.1
Unclassified	16.5	10.1

[1]These men had previously been examined before employment for gross heart defects.

[2]This figure represents all grades of thickening. No subdivision was then attempted in classification.

[3]These men were taken right from their work and examined during the heated term in July, which may possibly account for this high percentage.

[5]Teeth ..... 14.27 per cent.
Gums ..... 14.07 per cent.
Both ..... 41.01 per cent.

Cornaro's principles of hygiene, and the more extended discoveries of modern science, are easily adoptable by every boy and girl, every man and woman. These principles involve no irksome burdens, and no sacrifices; they are the simple natural methods of availing one's self of the greatest source of enjoyment. Through their adoption every young man and young woman may become a "noble" in a physical and moral sense.

These principles of hygienic living, in order to make them practicable for everyday use, have been formulated by the Life Extension Institute, Inc., into fifteen simple rules (see *How to Live,* Funk and Wagnalls Company, New York and London), which are given below in brief elaboration:

1. Ventilate every room you occupy.

It is certainly more pleasurable to live in a room in which the air is fresh and sweet, like out-door air, than in a stuffy, close atmosphere. To be sure, old-fashioned people did not seem to

be particularly clever about availing themselves of such pleasures. In some country homes the windows were nailed down to prevent fresh air from entering. Modern men and women, however, will not be denied the blessings of pure, sweet air, and have devised methods of obtaining it inside their houses, winter and summer, without any attending discomforts.

The use of window boards is one method. A window board three or four inches high which stands on the edge of the window sill deflects the incoming air upwards, so that it may reach the breathing zone, instead of simply flowing on to the floor and chilling the feet. Any enterprising boy can make one of these window boards and perhaps save his whole family from sickness during the winter.

After fresh air enters the house, it should be kept fresh. For one thing, it must be kept free from dust. This should be removed from the floor and furniture, not by the old-fashioned feather duster and the broom, which scatter the dust into the air, but by a damp or oiled cloth. Dust-catching furniture or hangings are not hygienic. A carpet sweeper is more hygienic than a broom, and a vacuum cleaner is better than a carpet sweeper. The removable rug is an improvement over the fixed carpet. Dust should be removed not only because it is harmful in itself, but because it is a vehicle for the carrying about of harmful bacteria.

A very common and at the same time injurious form of air vitiation is that from tobacco smoke. Smoking, especially in a closed space such as a smoking room or smoking car, vitiates the air very seriously for smoker and non-smoker alike.

The best way to keep air fresh is to have it constantly renewed. It is well to have an entrance for fresh air and an exit for used air, bringing about a constant circulation. Where there cannot be such a cross-current some circulation can be secured by having a window open top and bottom. Air fans are also useful for keeping the air from getting stagnant, especially in summer.

Drafts are not necessarily the evil things which many people think them. A gentle draft, as a matter of fact, is one of the best friends which the seeker after health can have. Of course a strong draft directed against some exposed part of the body, causing a local chill for a prolonged time, is not desirable; but a gentle draft, such as ordinarily occurs in good ventilation, is extremely wholesome.

It goes without saying that persons unaccustomed to good ventilation, and consequently oversensitive to drafts, should avoid overexposure while they are in the process of changing their clothing. But after even a few days of enjoyment of free-moving air, with cautious exposure to it, the likelihood of colds is greatly diminished. Persons who continue to make friends with moving air soon become almost immune to colds. Army men have often noted that as soon as they are on the march and sleep outdoors, they seldom or never have colds, but they develop them as soon as they get indoors again.

In every household there should be an accurate thermometer. It should be someone's duty to watch that thermometer from time to time, and not permit the temperature to rise above 70 degrees; preferably it should be kept between sixty-five and sixty-eight degrees. The average individual is overdressed, during the winter time, for a house temperature of seventy degrees. With windows closed and usually no adequate and constant means of ventilation, the air is stagnant and overheated, and the skin- and surface-circulation of the blood is rendered oversensitive to the sudden and extreme changes of temperature so common in temperate climates.

2. Wear light, loose and porous clothes.

A truly healthy body is not the waxy-white which is so common, but one which glows with color, just as do healthy cheeks exposed to open air. Clothing, therefore, must allow of ventilation, namely, such as will allow free access of air to the skin, requires that our outer clothes—including women's gowns and men's shirts, vests, vest-linings and coat-linings—should also be loose and porous. Most linings and many fabrics used in outer clothes are so tightly woven as to be impervious to air, yet porous fabrics are always available, including porous alpacas for linings. To test a fabric it is only necessary to place it over the mouth and observe whether it is possible or easy to blow the breath through it.

Exercising in cool air—not too cool—with clothing removed, is an excellent means of hardening the skin and of promoting good digestion.

The constriction from rigid and tight corsets, belts, tight neckwear, garters, etc., interferes with the normal functions of the organs which they cover. All such constriction should be carefully avoided. The tight hats generally worn by men check the circulation in the scalp. Tight shoes, with extremely high heels, deform the feet and interfere with their health. Several anatomical types of shoes, that is, shoes made to fit the normal foot instead of to force the foot to fit them, are now available. In all except cold weather, low shoes are preferable to high shoes. When possible, sandals, now fortunately coming into fashion, are preferable to shoes, especially in early childhood; but the adult, whose calf muscles and foot-structure are not often adapted to such footgear, must be cautious in their use, lest flat-foot results.

Only the minimum amount of clothing that will secure warmth should be worn. Woolens protect most, but they require the least exercise of the temperature-regulating apparatus of the body. While wool is also highly absorbent of moisture, it does not give off that moisture quickly enough. Hence, if worn next the skin, it becomes saturated with perspiration, which it long retains, to the disadvantage of the skin. Consequently, woolen clothing is best confined to overcoats and outer garments, designed especially for cold weather. The underclothes should be made of some better conducting and more quickly drying material, such as cotton or linen. In winter light linen-mesh, and medium wool over that, or "double-deck" linen and wool underclothes can be worn by those who object to either linen or wool alone.

Those who have learned to clothe themselves properly find that they have grown far more independent of changing weather conditions. They do not suffer greatly from extreme summer

heat nor extreme winter cold. Especially do they note that "raw," or damp, cold days no longer tax their strength.

3. Seek out-of-door occupations and recreations.

Those who spend much of their lives in the open enjoy the best health and greatest longevity. Climate of itself is a secondary consideration. Not every man can choose the best climate in the world. The main advantages of fresh air can be enjoyed in almost any climate. Even in a city, outdoor air is, under ordinary circumstances, wonderfully invigorating. The common prejudice against damp air greatly exaggerates its evils. While moderate dryness of air is advantageous, it seems nevertheless true that to live in damp, even foggy, air out-of-doors is, in general, more healthful than to live shut up indoors.

Observations have shown that the pupils in outdoor and open-window schools are not only kept more healthy but learn more quickly than those in the ordinary schools. Parents should insist on fresh air for their children when at school. For themselves, also, they should not neglect fresh air; they should attend outings and picnics, and take visits to parks. Whenever there is a choice in the matter, outdoor recreation should be given preference to indoor.

Outdoor occupations should also be chosen when possible in preference to indoor ones—such as working on a farm rather than in a factory. Leaving the country for the city is often disastrous, even for the purpose in view, namely, to gain wealth; for wealth gained at the expense of health always proves in the end a bitter joke. The victim proceeds, through the rest of his life, to spend wealth in pursuit of health. This does not mean, however, that it is not perfectly possible to keep well in the city, provided care is taken to obviate the city's hygienic disadvantages.

4. Sleep out, if you can.

It is the universal testimony of those who have slept out-of-doors that the best ventilated sleeping room is far inferior in healthfulness to an outdoor sleeping porch, or to an open tent, or to a window tent (large enough to include the whole bed). For generations, outdoor sleeping has occasionally been used as a health measure in certain favorable climates and seasons. But only in the last two decades has it been used in ordinary climates and all the year round. To-day many residences are built with outdoor sleeping porches.

Outdoor sleeping increases the power to resist disease, especially the disease of tuberculosis, and greatly promotes physical vigor, endurance and working power. Many people are deterred from sleeping out by a mistaken fear of night air and the malaria which they imagine this dreaded night air may bring. To-day we know that malaria is communicated by the bite of the anopheles mosquito and never by the air (see MOSQUITO). The moral of this is not to shut out the night air, but to shut out the mosquito by screens. It is very important, in any sleeping balcony to be protected from the wind in winter, and care must be taken to dress warmly, to have plenty of bed-clothes, a thick mattress, and to keep the bed dry.

When a sleeping porch is not available, an inward window tent can always be had, which puts the sleeper practically out-of-doors and at the same time cuts off his tent from the rest of the room.

5. Breathe deeply.

Breathing exercises should be deep, slow, rhythmic and through the nose, not through the mouth. There have been famous examples of restoration to health simply by the use of this measure.

Muscular exercises stimulate deep breathing, and in general the two should go together. But deep breathing by itself is also beneficial, if very slow. Forced rapid breathing is comparatively valueless, and indeed may be positively harmful. Oxygen is absorbed only according to the demand for it in the body, and not according to the supply.

Singing requires deep breathing, and is, for that and other reasons, an excellent hygienic practice.

6. Avoid overeating and overweight.

Everything we eat is not food. How much we should eat depends upon what we eat. The amount of food in different eatables varies widely. A third of an ounce of olive oil is as much food as a whole pound of tomatoes, or of celery, lettuce, cucumbers, string beans, asparagus or watermelon.

What to eat depends somewhat upon one's weight. Many people are too fat because they eat too much food. Sometimes they think they are "small eaters," for most people measure food by its bulk. The fact may be that while one is taking a moderate amount of bulk, one may be selecting, to make up that bulk, things very high in food value, so that in reality one is eating much more food than is needed, and the body is storing it up in fat. Fatness is not a desirable condition for the health. Even a slight degree of overweight is a disadvantage. After the age of thirty-five those slightly under the average weight show the lowest death rate.

Anyone who is overweight should shun the things of high food value, and should fill the stomach only with things of low food value, such as green salads (leaving out the oil in the dressing), and such vegetables as cabbage, turnips, parsnips, spinach, asparagus, etc. An overweight should not eat a lot of bread and butter, cereals, oil, cream or sweet things. Raw fruits (except bananas) should be used freely. Such a person should be particular to avoid munching candy, nuts, peanuts, popcorn and such things, between meals, and he should not drink with meals, although of course everyone, fat or thin, should remember to take some water between meals. Underweights can indulge more freely in the things tabooed for overweights. It is never wise, however, to eat more than one can digest, even for the purpose of gaining weight. "A lean horse for a long race" is a good motto, if the leanness is not due to anemia or other disease and is accompanied by a sense of well-being.

7. Eat sparingly of meat and eggs.

Meat and eggs are particularly high in food value, in relation to their bulk. It is wise, there-

fore, to mix these foods with vegetables, green salads and fruits, to bring down the average food value for the total bulk needed, and to furnish fruit and vegetable acids, minerals, etc. The stomach should be comfortably filled, not overloaded. But its contents should be made up of things not too high in food value. The mistake which is generally made is of filling the stomach with things too high, such as meat, fish, eggs, rich desserts, cream, candy, etc.

It is well to have a printed table of food values to which to refer for authoritative information regarding what things have lots of food in them, for their bulk, and what ones have not. It is easy enough to remember, however, that all meats and eggs are high in food value, that among the vegetables peas and beans are high, that pure fats are high and sugar is high. These should never be taken in large quantities by themselves, but should be mixed with other foods of lesser nutritive value, such as potatoes, turnips, cabbage, spinach, lettuce, tomatoes, celery, fruits, etc.

The most expensive foods are by no means the best to eat. Among the best foods for most people are fruits, potatoes and other vegetables, nuts (if well chewed), green things, cereals and milk. These are among the cheapest foods. Putrefactive cheese, sweetbreads, liver, kidneys, oysters and "high" game and poultry are not so good for us, and most of them are rather expensive.

There are mainly three kinds of food, called *protein*, *fat* and *carbohydrate*. Protein food is what we get from lean meat or fish and the white of egg. Fat food is what we get from butter, oil, nuts and fat meats. Carbohydrate food is what we get from bread, cereals, rice, sugars, potatoes and fruits.

Protein food repairs the structure of the body. Fats and carbohydrates furnish the energy. Protein corresponds to the iron with which a stove is repaired, while fat and carbohydrates correspond to the fuel which is burned in the stove. We need in protein only ten per cent of the food value of what we eat; that is all that is required to replenish worn tissues, even in the most active people. The remainder of the food should be in fat and carbohydrates, the latter twice as much as the former.

That is why we should eat sparingly of meat and eggs, lest we get more protein than we need and it becomes a burden to the body. This excess has to be used as fuel, and it is not as good fuel as other kinds of food. Also, protein foods decay rapidly, and decayed food in the intestines causes several kinds of damage. It causes fatigue and various illnesses and burdens the liver and kidneys, which are the organs whose duty it is to eliminate poisons.

8. Eat some hard, some bulky, some raw foods.

It is a good idea to include some hard foods in the dietary, such as crusts, toast, hard crackers, hard nuts, and fibrous vegetables. They make it necessary to chew, which is good for the teeth and gums, and for the digestion. The most of us do not chew enough.

While we need a certain amount of food, we also need a certain amount of bulk, regardless of its food value. This is one of the reasons why we cannot subsist entirely on very fat or very sweet things, for they have a great deal of food value in little bulk, and bulk is needed to keep the intestines moving; also, they lack certain mineral elements and certain substances called vitamines, which do not furnish fuel or energy but are needed to keep our tissues healthy.

Certain elements that the body needs are lost from some foods when they are cooked. So it is well for the average person to eat some raw foods every day—fruits, nuts, milk, salads, etc.

9. Eat slowly.

Whether it be from lack of hard foods requiring prolonged chewing, or from the nervous hurry of modern life, or from other causes, it is undoubtedly a fact that most people eat too rapidly. The correction of this habit will go far toward reforming an individual's diet in every way. Thorough mastication means masticating up to the point of involuntary swallowing. It does not mean forcibly holding the food in the mouth, counting the chews and otherwise making a bore of eating. It merely means giving up the habit of forcing food down, and applies to all foods, even to liquid foods, which should be sipped.

The habit of insufficient mastication is subtle, because it has become second nature to most of us. To free ourselves of it we must first of all allow plenty of time for our meals and rid our minds of the thought of hurry. A boy's school in which the principal is endeavoring to fight the habit of food-bolting has wisely ordained that no boy may leave the dining room until a certain hour, even if he has finished eating long before. In this way the boy soon learns that there is nothing to be gained by fast eating and that the pleasantest way of spending the mealtime is by prolonging the relish of the food. It would be well if all of us would adopt a similar rule for ourselves.

10. Evacuate thoroughly, regularly and frequently.

The sewage channel of the body is not always efficient in releasing its wastes. This condition of stagnation, or sluggish movement which we call *constipation*, is so common that it is accepted by most people as an inseparable feature of so-called civilized existence. The condition of constipation is not only an important factor in reducing the general level of health, but it is, in itself, often an index of lowered bodily vitality.

The causes of constipation are manifold, but may be grouped under the general cause of improper living habits. Heredity plays some part, as many people are poorly endowed at birth as regards their muscular and nervous systems. Left to drift for themselves, they naturally develop bowel weakness and inefficiency. Proper physical care and training in early life can transform many of these cases and protect them in later life. A prominent cause of constipation is the use of laxatives and purgatives. It is so much easier to take a pill or glass of mineral water than to study one's diet and properly modify it that the individual takes the course of least resistance, with the result that the bowels become tired out through continually being whipped and spurred, and finally absolutely refuse to move unless so whipped and spurred. Many purga-

tives, even those commonly considered harmless, such as laxative salts and mineral waters, are often very distinctly harmful, causing a chronic inflammatory condition of the bowels or aggravating the already existing inflammation that is present in certain types of constipation.

The chief error in diet that induces constipation is the use of concentrated food. Such food leaves little residue or waste to stimulate the bowel movement. Another dietetic error is the use of white flour and of grains that have been deprived of their shell or coating. A meat and potato and white-bread diet is ideal for inducing constipation. Lack of "roughage," or coarse vegetables, and of fruit, is harmful, in that it deprives the bowels of stimulus and the body of elements necessary to health that are found in certain vegetables, in the skin of cereals and in fresh fruit.

The average uncomplicated case of constipation will yield readily to the regulation of diet along very simple lines. Water should be taken sparingly at meals, but quite freely between meals, as well as early in the morning. Fruit and fruit juices are laxative and helpful. A couple of apples eaten in the evening will often prove effective. Other desirable fruits are citrous fruits, figs, dates and prunes. The use of Graham or whole-wheat or corn bread and whole cereals is important. The amount of meat taken should be strictly limited—not more than once daily. But such vegetables as peas, beans, lettuce, parsnips, carrots, turnips, celery, oyster plant, cabbage, Brussels sprouts, tomatoes, salsify, Spanish onions, asparagus and spinach should be freely taken. Liberal portions of at least two of these vegetables should be taken at luncheon and dinner.

Always, however, the digestive capacity and personal peculiarities of the individual should be taken into consideration. In some cases certain vegetables disagree, and a diet containing "roughage" is not well borne, especially if the dietetic habits are suddenly changed. There are few people, however, who cannot take fruit, whole cereals and Graham bread. In lieu of bulky vegetables, purified agar-agar, a Japanese seaweed, may be taken in teaspoonful doses two or three times a day, mixed with cereals or other food, as it is tasteless and inert. This preparation adds to the mass in the intestines and gives the bulk necessary to bring about activity in the bowels. It is not a drug, and has no habit-forming dangers.

Another preparation now much used is mineral oil. This oil is not absorbed or digested, but passes through the bowels and softens their contents, so that they are able to slip through more rapidly. It has no drug effects, and hence is not open to the objections that obtain against ordinary purgatives. Sterilized bran is another preparation that is useful in cases of constipation. It may be taken in cereals, in equal parts, or made into biscuits with one part bran and two parts flour. When used in this way the bran should be carefully sifted, to remove all foreign substances, and then sterilized by boiling or baking.

In cases where there is any question of relaxed or fallen bowels, which is often the case in thin and anemic people who show bad posture, exercise on an inclined plane, such as an ironing board tilted up at one end, is helpful in restoring a normal position of the bowels and improving the abdominal muscles. Lack of regular attention to the bowel function is perhaps the most common cause of constipation. Under a normal physiological diet, the bowels should move after each meal. It is probably seldom that one hasty movement a day thoroughly evacuates the large bowel. A sufficient time should be given for a thorough evacuation.

11. Stand, sit and walk erect.

To set the shoulders back and square them evenly, to keep the chest high well arched forward, the stomach in and the neck perpendicular, like a column, and the chin in, are simple fundamental principles that most people know and many people disregard. Whether sitting, standing or walking, these principles, involving a correct and pleasing carriage and a healthful relation of the organs and structures of the body, should be observed by both men and women.

In walking, the most common error is to slump, with the shoulders rounded, the stomach thrust out, the head thrust forward, chin up and the arms hanging in front of the body. This is a slump characteristic of those with weak muscular and nervous systems. It has even been held that neurasthenia, nervous prostration and mental despondency can be caused by faulty posture, through its effects upon the relation of organs and the circulation of the blood. However that may be, there is no doubt that a drooping posture aggravates the condition of neurasthenia and the various forms of displacement of the stomach and abdominal organs, and that the correction of faulty posture aids in the cure of these conditions. Special exercises are beneficial in correcting faulty posture. See NEURASTHENIA.

It is not enough to have a correct carriage and a well-poised head. We must have well-directed feet. Weak feet are gradually converted into flat feet by faulty standing and walking posture. Toeing out, whether walking or standing, so commonly noted among girls and women, places a certain strain upon the arches of the foot. The correction of this fault by persistent toeing in, Indian fashion, and daily exercise of the leg muscles (rising on the toes twenty or forty times night and morning), will do much to prevent flat foot. When standing, do not keep the heels together and toes out, the ordinary attitude prescribed by athletic manuals as the military attitude of "attention," but keep the heels apart, like the military attitude "at rest," with toes straight forward, the sides of the feet forming two sides of a square. This attitude gives stability and poise and insures a proper distribution of the weight of the body upon the structures of the feet.

Those who stand a great deal should avoid distorted positions, such as resting on one foot and sagging to one side. The body weight should be kept evenly supported on both feet. When the condition of flat foot is found, it should be first considered by a physician or a surgeon, before it is treated by a shoemaker. The ordinary arches supplied by shoemakers, do not cure flat foot.

Shoes for such feet should be made to order, and have a straight internal edge. All sueh measures must be supplemented by proper exercise and the correction of faulty position of the feet while standing.

In sitting at a desk or table, when readlng or working, the eommon fault is to adopt a sprawling attitude, with the shoulders hunched up, the elbows stretched outward and the body too far away from the desk or table, and the weight resting on the buttoeks. Very often the desk or table is too high, thus causing a eontinuous strain on the struetures around the shoulder jolnts. Pains, erroneously aseribed to rheumatism, or sciatica, are often due to this faulty posture. To correet this fault, use if possible a chair with a back that eurves forward. Sit well back in the chair, but close to the desk, so that the fleshy inner part of the forearms may rest easily upon its surface without pushing up the shoulders. When lt is neeessary to lean over a desk, acquire the habit of inclining the body forward by bending at the hips and not by distorting the thorax or ehest. The arms should hang easily from the shoulders, and the elbows should not rest upon the table. The shoulders should be evenly square, as in the correct standlng posture. In right-handed people, the light should fall over the left shoulder or direetly from above. The body should rest upon the full length of the thighs, not solely on the buttocks, and the feet (not legs) should be crossed and resting lightly on the ground on their outer edges.

In children faulty posture may mar the future of the individual by eausing spinal curvature and physieal deformities that interfere with the physical and mental efficiency throughout life, and often lower the resistance to disease. Deep breathing through the nose and setting-up exereises are of incaleulable importanee in sueh eases.

12. Do not allow poisons and infections to enter the body.

Among the poisons which must be kept out of the body should be mentioned habit-forming drugs, such as opium, morphine, eocaine, heroin, chloral, acetanilid, alcohol, eaffein and nicotine. The best rule for those who wish to attain the highest physieal and mental effieieney is total abstinence from all substanees which eontain poisons, ineluding spirits, wine, beer, tobaeeo, many much-advertised patent drinks served at soda-water fountains, most patent medicines, and even coffee and tea. Many so-ealled "patent," or proprietary, medieines eontain habit-forming drugs, espeeially morphine, coal-tar preparations, caffein and alcohol, and depend largely for their sale upon the effects of these harmful substanees. Harmful preservatives and adulterants in foods, sueh as saccharin, should also be avoided.

Sclentific experiments have resulted in the interesting discovery that the alleged "strength" obtained from beer, ales and all intoxieating beverages is a delusion. The poison simply gives a temporary feeling of greater strength through paralysis of the sense of fatigue. But the strength does not exist. On the eontrary, the user of alcohol in exeess is weaker after taking it. Special elasses of workmen have been tested as to their effieiency under liquor in small amounts and without it entirely, and it was invariably found that the liquor was a handieap, but that, also invariably, the workmen thought they could work harder by its aid. Alcohol numbs the sense of fatigue and so deeeives the user. It is not a stimulant, but a narcotic. The habit of taking a coektail before meals is harmful.

It is well known that people who indulge in alcohol show less resistance to infectious dlseases than abstemious individuals. The paralysis of the white blood-corpuseles is one of the strong arguments against the use of alcohol. The experienee of life insurance companies has clearly shown that even the moderate drinker has a shorter life than the man who does not drink at all. Over seventy insuranee companies in America have proved that the man who drinks two glasses of beer a day or one glass of whisky is eighteen per eent less desirable a risk than the total abstainer.

The evils of tobaeeo are not so well understood as are those of aleohol, but every athletie trainer observes that the use of tobacco lessens physical fitness. The ordinary smoker is unconscious of this, and often denies it. At Yale, at Amherst and at the University of Utah, studies of the condition of smokers and non-smokers have been made whieh show a great advantage on the side of the non-smokers.

The infeetions of eommon eolds are always to be found in the nasal passages, and become aetive when the individual is subject to fatigue or indigestion or both. The liability of catching cold is greater when the mueous lining is injured. Nasal douches are injurious and impair the proteetive ability of the mucous membrane. They should be used only on prescription.

The germ of tuberculosis is probably conveyed oftenest through the sputum of consumptives, which has been allowed to dry, has become pulverized, and is breathed into the system. All sputum should be burned. It is well to avoid rooms oeeupied by eonsumptives who are not careful with their sputum.

Suitable wire netting will guard us from malaria and yellow fever, the infections brought by mosquitoes and flies. "A yard of screen in the window is better than a yard of crepe on the door." The greatest triumph in conneetion with the building of the Panama Canal was not the engineering but the reduetion in the death rate among the workers, whieh, on account of these inseet-borne diseases, had previously prevented the suceessful execution of the undertaking.

We take in many diseases through our food and drink. To elude the typhoid germ, we need first of all pure water. When one is in doubt as to the purity of water, it is advisable to boil it. Another measure for avoiding typhoid is to pasteurize milk. In protecting the food against all kinds of impurities which injure the body, we must remember that the earrier of typhoid fever, the eommon house-fly, deposits typhoid germs on the food, through whieh the germ is taken into the system. The most effeetive method of fighting flies is by preventing their breeding. Their favorite plaees for this are horse manure, but they will breed in almost any mass of fermenting organie material. Manure piles and stables

should be screened, and the manure removed at least once in seven days. Garbage pails should be kept tightly covered. Fly-paper and fly-traps should be used. Houses should be screened, and in particular in the pantry the food itself should be screened.

Ticks, bedbugs, fleas and lice should also be carefully exterminated. They are often responsible for infectious diseases. The hookworm disease is to be avoided by not treading barefoot on ground polluted by victims of the disease, by preventing soil pollution through the proper disposal of human excrement, and by screening all waterclosets.

Cleanliness is important for avoiding infections. The hands, face and finger nails should be kept clean; especially before meals. Any cut or crack in the skin or mucous membrane may admit germs when the spot is dirty or is touched by dirty hands. The need of bathing is particularly great for those who work in factories, mines and other places where dirt is likely to be carried to the mouth by the hands. Probably many diseases get a foothold in this way, without the victims realizing in the least that they were due to carelessness and lack of cleanliness.

Some of the most serious and widespread, although usually unmentioned, infections, are those from the venereal diseases, with a whole train of terrible consequences, such as blindness, joint-diseases with heart complications, peritonitis, paralysis and insanity. From even the narrowest interpretation of hygiene, a decent life is necessary for the maintenance of health. Dr. Rosenau says: "Every boy and girl, before reaching the age of puberty, should have a knowledge of sex, and every man and woman before the marriageable age should be informed on the subject of reproduction and the dangers of venereal diseases. Superficial information is not true education. On the other hand, it is a mistake to dwell unduly on the subject."

13. Keep the teeth, gums and tongue clean.

There are two forms of mouth danger—dental caries, or decay, and pyorrhoea, or Riggs' disease. The former is largely a chemical process, and affects the teeth proper. The latter affects the tissues surrounding the root of the teeth and is accompanied with infection by pus bacteria, and possibly also with animal parasites termed *endameba*. Scrupulous cleanliness of the mouth largely prevents both of these maladies.

A cavity in a tooth is a menace to the health, as it harbors various forms of bacteria which may infect the general system. The same is true of pyorrhoea, as far as the general health is concerned. The germs from the abscess may get into the system and cause many other kinds of illness, such as so-called rheumatism, certain forms of anemia, etc. All the ills that flesh is heir to are not caused by mouth infection, but enough of them are to more than justify a vigorous and world-wide campaign for the better care of the teeth, and for a thorough search for mouth infection in every case of obscure disease.

The cultivation of normal eating habits with respect to the vigorous use of the jaws by thorough mastication, and the eating of hard, resistant, crusty foods every day is the next desirable means of tooth and gum hygiene. The teeth should be cleaned night and morning, and after each meal, if possible, by rapid rotary brushing. Strong pressure is not advisable. A brush should be used with bristles that are stiff and of different lengths, so that the innermost crevices of the teeth may be reached. If the gums are sensitive, a moderately stiff brush can be used until the gums can bear the more vigorous treatment. The use of dental floss between the teeth, provided care is taken not to press it against the gums, is also helpful.

The tongue should also be carefully cleansed with the tooth brush. By taking care not to hit the roof of the mouth, gagging is avoided.

The advice of a dentist should be sought regarding the condition of the teeth, and the question of alkaline or acid washes determined. Periodic examinations and cleanings by the dentist are the only safe measures against decay and pyorrhoea. If the dentist has facilities for giving preventive treatment by specially cleaning the teeth, he should be visited every other month. If such a program is adopted, it will generally be found unnecessary to visit him for any other purpose.

Some dentists and physicians have until lately given too much attention to the saving of teeth, without fully realizing the dangers of infection from the mechanical devices employed. This is not to say that all bridge and crown work is improper, but that such work should only be of a character that will permit of surgical cleanliness in the mouth, and that such teeth should always be examined by the X-ray, when there is evidence of systematic disease, in order to be sure that the roots and sockets are not infected.

In early life the jaws should be carefully examined by both dentist and doctor in order to determine whether or not the proper development is taking place. If upper and lower teeth fail to fit well together, extra strain is placed upon certain teeth and the sockets are liable to injury and infection. The temporary teeth should not be allowed to be removed by decay. If cavities form, they should be filled and the teeth saved, unless they are causing infection.

14. Work, play, rest and sleep in moderation.

The whole personality should be utilized in a daily rhythm. When, as too often happens, the equilibrium and mutual proportions of the various wholesome elements in a well-rounded life have been lost, the balance should be restored if possible the next day. If a physician has had his sleep broken, he should aim to make it up at the earliest opportunity. If the afternoon exercise has had to be omitted, an extra amount should be taken as soon as possible.

It is distinctly unhealthful either to overdo or to underdo work, play, rest or sleep. Not all people are in need of exercise, nor are all in need of rest; but almost every one needs to change his proportion between the two. Normal work is one of the greatest blessings of life, but too many miss the joy of it, some, because their work has gone to the extreme of drudgery, and others, because it has shrunk into nothingness and futility.

A very moderate degree of fatigue is normal, but anything that approaches exhaustion should be avoided with the utmost care. Working hours should be arranged so as to enable the worker

to recuperate overnight, partly from sleep and partly from the recreation enjoyed in leisure between work and sleep. Variety in work is especially needed in modern times, when specialization tends to lead men to extremes. Changes in work which prevent a sense of monotony will greatly increase the power to work. A clerk will do more work, and do it more effectively, if he is occasionally allowed something else to do than to foot up columns of figures. If the monotonous strain of performing numerical additions is interrupted a few times daily, the adding faculty of the brain is given much-needed rest. Many men in the higher ranks of life complain of the many interruptions which they suffer, but if they would welcome these interruptions, instead of allowing themselves to be irritated by them, each interruption would serve the purpose of a vacation. It is in this way that some of the greatest workers, like Gladstone, have been enabled to accomplish so much.

The strain of modern life is sometimes special rather than general, and one of the most commonly-strained organs is the eye. One should be careful not to read in a waning light, or on the other hand, in the glare of the sun. If one works facing a window, it is advisable to wear an eyeshade.

To offset the evils of a sedentary life, it is advisable to spend one hour daily, if possible, in some kind of vigorous physical exercise. If this is not possible, at least fifteen minutes should be taken for it. The most beneficial exercise, as a rule, is that which stimulates the heart and lungs, such as running, rapid walking, hill-climbing and swimming. These should, of course, be graduated in intensity with varying ages and varying degrees of vitality. Gentle muscular activity after meals promotes general digestion and should be practiced for a quarter of an hour after each meal, but violent exercises immediately after meals should be avoided, as a large amount of blood is then engaged by the digestive system.

There is accumulating considerable evidence that college athletics often seriously injure those who engage in them, although they were originated and encouraged for precisely the opposite effect. The value of exercise consists not in developing large muscles nor in accomplishing athletic feats, but in attaining physical poise, symmetry of form and the harmonious adjustment of various parts of the body, as well as in furthering the proper activity of cell-tissues and organs and the elimination of waste products.

Not only the functions of the body, but those of the mind require exercise—exercise in thinking, feeling and willing. A person who does not read or think loses some of the ability to read and think. The physical worker often allows his mind to become dull and sodden. The accountant who adds up figures all day has no chance to exercise his judgment and other mental faculties. The person who does not exercise his artistic, poetic or affectional side will suffer its atrophy. The exercise of the will is of first importance. The will is exercised every time a decision is made.

Since the work of most people is likely to produce some unhygienic element which cannot be avoided, a compensation should be sought in an avocation or hobby, to be practiced out of regular working hours. Often the avocation can serve a productive purpose. Gladstone and Horace Greeley sawed wood or chopped down trees for recreation. A well-known engineer divided his recreation between writing stories and painting pictures.

The power to relax, when fatigue requires it, is one of the most important safeguards one can possess. A very hard-working college president, when asked about the secret of his working power and length of life, replied, "My secret is that I never ran when I could walk, never walked when I could stand, never stood when I could sit, and never sat when I could lie down." For idle and lazy people the rule should be reversed—never to lie down when one could sit, never to sit when one could stand, and never walk when one could run! A complete life must have all in due proportion.

Sleep is Nature's great rejuvenator, and the health-seeker should avail himself of it to the full. Our sleep should not only be sufficient in duration but also in intensity, and should be regular. The number of hours of sleep varies with circumstances. The average is seven to nine. Growing children require more sleep than their elders.

One's best sleep is on an empty stomach. It is true that food puts one to sleep at first, by diverting blood from the head; but it disturbs sleep later. Water, unless it induces bladder action during the night, or even fruit, may be taken without injury before retiring. If one goes to bed with an empty stomach, he can often get along well with six or seven hours of sleep, but if he goes to bed soon after a hearty meal he usually needs from eight to ten hours of sleep.

The character of sleep depends largely on the mental attitude on going to bed. One should get into the habit of absolutely dropping work and cares at bedtime. If then one suggests to himself the pleasantest thought which memory or imagination can conjure up, his sleep is likely to be far more peaceful and restful than if he takes his worries to bed, to keep him awake until sleep comes in spite of them, and then continues to plague him in his dreams. If one is worried, it is a good plan to read something diverting, but not exciting, just before retiring.

15. Keep serene.

A healthy mental attitude implies many elements, but they are roughly summed up in the word "serenity." The attitude of "healthy-mindedness" should be striven for not only in order to procure health, but as an end in itself, for which in fact even health itself is properly sought. In short, the health of the body and the health of the mind act and react upon each other.

We may generally keep serene through following the hygienic measures already described. Discontent is undoubtedly very often the consequence of wrong conditions in the body, and though melancholy, worry, peevishness and fear generally appear as arising from outward conditions, there are usually real physical sources, existing within the body itself. These are at times most difficult of recognition. A person who is physically ill is liable to be ill-satisfied with everything, without suspecting the fundamental cause of the

discontent. When the apparent "cause" is removed, the discontent remains none the less, and fastens itself on the next thing that comes along. Although some little event such as the mistake of a tradesman or a cross word of a friend may seemingly "cause" a disagreeable reaction in a man if he is ill (whether he knows it or not), the same "cause" does not necessarily produce that same reaction at all times. When he is in a healthy mood, the "cause" may be entirely inadequate to bring about the same result. The near approach of the menstrual period in women is often accompanied by mental depression and physical fatigue which it is almost impossible for the sufferer to recognize at the time as caused by anything but "real" or outside misfortunes. Other physical conditions act in the same way. The hidden cause may be constipation, eye strain, the effects of alcohol or other drugs, a sedentary life, a bad posture or weak abdominal muscles; and the proper remedy may be an enema, a pair of glasses, a vigorous swim, deep breathing exercises or an abdominal supporter, an erect carriage or a general change of daily habits. Whatever the trouble, the remedy lies always at hand.

Summary. Health for the body awakens mental capacities where they exist. Failure in mental work can often be traced to failure in physical health; and the restoration of bodily health is often essential to success in the tasks of the mind. This is especially true of the artistic professions, where the kind of product is dependent so largely upon the state of the emotions, upon exhilaration and enthusiasm.

It is certain that mental perturbation affects the body in many ways. Embarrassment fills our cheeks with blood. Fear drives the blood away. Excitement quickens the heart beat. Grief brings tears. A great shock to the mind may cause fainting, the rush of blood from the head into the abdomen. Worry will interfere with digestion. The X-ray has detected the arrest of the peristaltic movement of the stomach and intestines because of strong emotions.

It is doubtless on account of such influences of the mind on the body that some persons who have attempted to improve their health by what they call "thoroughly masticating" their food—but who have interpreted this phrase as having a purely mechanical meaning—have wondered why they were not benefited when they forcibly held their food in their mouths until they performed a certain number of chews, while in fact they were making a bore of eating and forgetting to taste and enjoy. The mind and the emotions refuse to be ignored in this way, and exact due penalty from the body when they are not satisfied. To attain the desired results from any hygienic measures, it is apparently necessary, in some degree at least, to satisfy the mind along with the body.

There is one danger to which some people are especially subject—the danger of becoming hypochondriacs from paying too much attention to physical hygiene. Such a person becomes fearful lest he is not doing exactly the right thing. He looks suspiciously at every article of food, and fears that it will disagree. He fears that he has strained his heart; he worries over the loss of an hour's sleep; he chafes because his employer has not given him a vacation at the right time or of the right length. It might, in some cases, be better to disregard some rules of hygiene than to worry about them.

On this theory the devotees of mind-cure cults have derided every hygienic measure but one—their "mind-cure." They sometimes succeed in the "real cure of imaginary ailments" and the "imaginary cure of real ailments." In the latter case, the mental contentment lasts only until the real ailment becomes too aggressive to be ignored. But it is a great mistake to stake everything on the simple resource of mental equanimity. In its proper place "mind-cure" is an essential part of individual hygiene.

Each must learn for himself how best to avoid anger, fear, worry, excitement, hate, envy, jealousy, grief and all depressing or abnormal mental states. To do so is an art which must be practiced, like skating or bicycle riding. It cannot be imparted merely by reading about it. Worry, if unceasing, will often drain away a large source of energy. When, as unfortunately is often the case, the difficulty of maintaining one's serenity seems insuperable, the battle can often be won by "living one day at a time." Almost any one in ordinary conditions of adversity has it within his or her power, for merely one day, or at any rate one hour, or one minute, to eliminate the fear, worry, anger, or other unwholesome emotions clamoring to take possession. At the expiration of the hour, or the minute the same power can be exercised for the next ensuing period, and so on until one is caught napping, after which he must pick himself up and patiently try again.

The secret of equanimity consists not so much in depressing the fear or worry as in dropping or ignoring it—that is, diverting and controlling the attention. It does no good to carry a mental burden. "Forget it!" The main art of mental hygiene consists in the

control of the attention. "He that ruleth himself is greater than he that taketh a city."

Thoroughly carried out, individual hygiene, as practiced five hundred years ago by Cornaro, and as now being practiced by hundreds of thousands of modern men and women, implies high ideals of health, strength, endurance, symmetry, and beauty; it enormously increases their power to work, to be happy and to be useful; it develops not only the body, but the mind and the heart; it ennobles the man as a whole. E.L.F.

Related Subjects. The reader is referred to the following articles in these volumes:

Alcoholic Drinks
Health Habits
Hygiene of Education (subtitle, page 1944)
Medicine and Drugs
Mental Handicaps

LIFE INSURANCE. See INSURANCE.

LIFE, Length of, or **LONGEVITY,** *lon jev'i ti,* terms which are used to denote the average duration of life in man, different animals and plants. Since almost all forms of life differ from each other in the rapidity with which they develop, it is logical that few forms should have the same span of life. Plants, for instance, ordinarily grow up and die in a few months; yet spruce trees may live for 150 years, and a native tree of the Cape de Verde Islands, known as the *bavbab,* lives 5,000 years. The Big Trees of the Yosemite Valley in California are also centuries old (see page 1059).

In the case of animals it is usually those which take longest to reach maturity which have the longest lives. Below is given the estimated length of life in years of a representative number of animals. The extreme ages are not given, but the ages which the animals may be expected to reach under normal conditions appear as follows:

Animals

Whale	500	Pig	25
Tortoise	350	Cow	25
Crocodile	300	Ox	15-20
Elephant	100	Goat	15
Lion	40	Frog	12-16
Camel	40	Dog	15
Toad	36	Cat	13
Horse	27	Sheep	12
Leopard	25	Hare	10
Bear	25	Squirrel	6
Tiger	25	Mouse	6

Birds

Eagle	100	Goose	50
Swan	100	Sparrow	40
Crow	100	Skylark	30
Heron	60	Peacock	24
Parrot	60	Crane	24
Pelican	50	Canary	24
Linnet	23	Goldfinch	15
Pigeon	20	Hen	14
Nightingale	18	Blackbird	12
Lark	18	Robin	12
Pheasant	15	Thrush	10
Partridge	15	Wren	3

Fish

Carp	150	Eel	60
Pike	150	Lamprey	60
Salmon	100	Crayfish	20

According to statistics the average age at which man dies is about forty years, but because of advance in knowledge of medicine and sanitation this average will gradually rise (see MORTALITY, LAW OF). A considerable number of the human race live to be from seventy to eighty years of age, and there are occasional instances of people attaining the age of one hundred years.

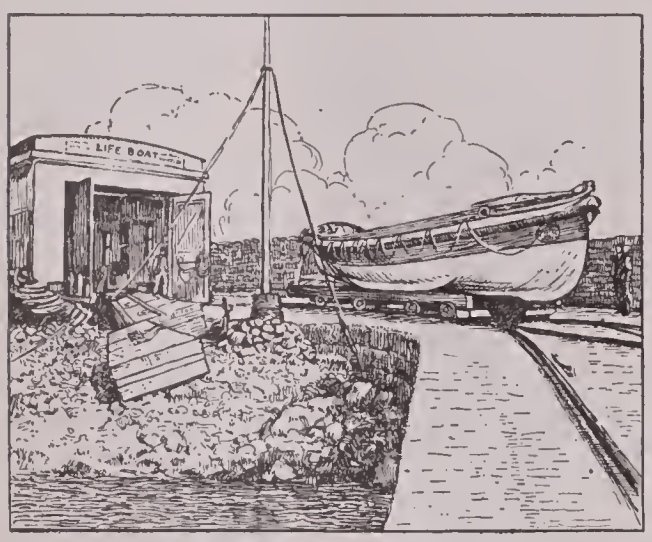
LIFE-SAVING SERVICE. Those who "go down to the sea in ships" from the ports of nearly all countries in the world north of the equator, except China, know that everywhere dangerous shores are patrolled by men skilled in the most scientific means of saving life. In most countries this humane service is supported by private contributions. In four only does the government assume its organization, management and expense. The South American republics, the vast stretches of African coasts and the semi-civilized Asiatic countries afford no means of saving life other than unorganized effort.

In the United States. The life-saving service of the American Union is the most notable example of government-controlled systems in the world, and is unsurpassed in efficiency. It was established by the Federal government in 1871. As early as 1807 benevolent organizations established life-saving apparatus on the Massachusetts coast; and the New Jersey shores, approached by a greater number of vessels, were equipped by the government with apparatus for the use of volunteers. From such a small beginning the service has been extended to include the eastern and western coasts, the Gulf territory, the Great Lakes and Alaska. Most of the stations are maintained all the year, but some, particularly on the Great Lakes, are in operation only seven or eight months of each year.

Each life-saving station is equipped with a serviceable building, sufficiently large to provide living quarters for the men and space for boats. A surf-boat is usually made of cedar, about twenty-five feet long and six to eight feet wide. Air chambers make it practically

unsinkable. When the sea is so rough that a boat cannot be launched a small bronze cannon is used to shoot a projectile to the vessel in distress. The range is from 400 to 700 yards. The projectile is a long bar, to one end of which is fastened a strong line. Over the rope thus stretched a breeches-buoy can be pulled from the vessel to the shore and passengers and crew may thus be rescued. The breeches-buoy is a circular life-preserver with a diameter of about three feet, to which stout canvas breeches are attached. It holds one person. See *Life Boat and Life Buoy,* below.

Until 1874 the life-saving organization was a division of the Revenue Cutter Service, and from that year until 1915 it was a bureau of the Treasury Department. The system was again reorganized by act of Congress passed on January 28, 1915, containing the following provision: "There is hereby established in lieu of the existing Revenue Cutter Service and the Life-Saving Service, to be composed of



LIFE-SAVING SERVICE

A lifeboat and light track by which it is easily and quickly put into the water. This is the most modern development in the mechanics of the service.

those two existing organizations, the *Coast Guard,* which shall constitute a part of the military forces of the United States and which shall operate under the Treasury Department in time of peace, and operate as a part of the navy, subject to the orders of the Secretary of the Navy, in time of war." The officers of the Coast Guard are on the same footing, with respect to rank and pay, as the officers of the army and navy. The Coast Guard stations are divided into thirteen districts, embracing the Atlantic, Gulf, Great Lakes and Pacific coasts, including Alaska. There are 279 Coast Guard stations and houses of refuge. One of these stations is located at the Falls of the Ohio, near Louisville, Ky. The following table shows the extent of service rendered for the fiscal year ending June 30, 1916:

Lives saved or persons rescued from peril	1,507
Persons on board vessels assisted	10,952
Persons in distress cared for	813
Vessels boarded and documents examined	24,817
Regattas and marine parades patrolled in accordance with law	37
Vessels to which assistance was rendered	1,504
Instances of miscellaneous assistance	556
Value of vessels assisted (including cargoes)	$ 10,927,730
Derelicts and obstructions to navigation removed or destroyed	26
Value of derelicts recovered and delivered to owners	$ 161,000
Total expenditure for maintenance of Coast Guard	$5,027,752.71

In Canada. In the Dominion the life-saving service is an important arm of the government. Canada has a coast line of great extent, but protection is required along only a small portion of it, as there is no navigation along the entire northern boundary, and the barren coast of Labrador, comprising a large part of the eastern boundary, has no maritime interests. The western coast of British Columbia, however, is becoming increasingly important, and the Great Lakes present practically the same life-saving problems to Canada as to the United States, The most important maritime sections of Canada center around Prince Edward Island, Nova Scotia, New Brunswick and for a distance up the Saint Lawrence River.

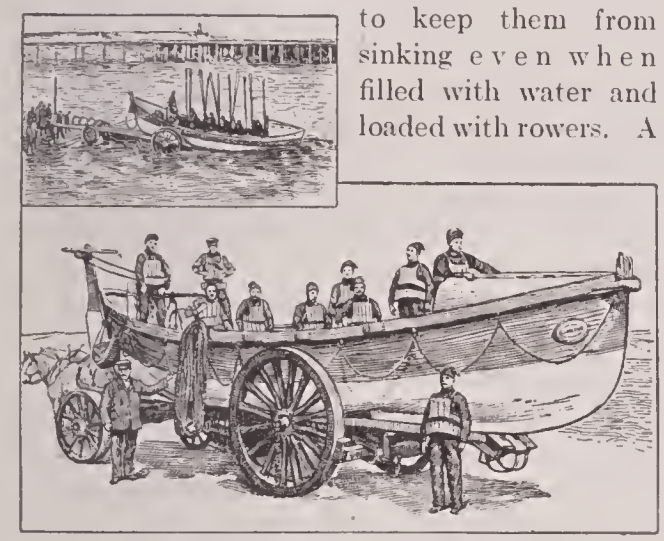
The Canadian service is a branch of the Dominion Department of Marine and Fisheries, under the direction of a General Superintendent of Life-Saving Stations. Halifax and Montreal are transatlantic shipping centers; the coasts adjoining are well patrolled. Victoria, Prince Rupert and Vancouver are west-coast centers of importance. Stations of the life-saving service are distributed as follows: New Brunswick, 3; Nova Scotia, 16; Prince Edward Island, 4; British Columbia, 4; Great Lakes, 11; at Victoria, B. C., the service is maintained by a private organization, the Victoria Life-Saving Association.

In England. The Royal National Lifeboat Institution was founded in 1824, and has several times been reorganized, each time with increasing efficiency. Its patrons include the king and other members of the royal family, and the highest dignitaries of the realm. The

receipts from all sources are about three-quarters of a million dollars a year.

Other Countries. The life-saving organizations of Belgium and Denmark are supported by the government; that of France is a voluntary association receiving government support, and that of Germany is entirely supported by voluntary contributions. Holland and Norway maintain voluntary associations which receive government subsidies. The organizations of Italy, Australia and New Zealand are voluntary associations. E.D.F.

Life'boat, a stout, buoyant boat used in rescuing persons from the sea. Lifeboats of the latest design are so constructed as to discharge water that breaks into them; they are broad of beam and are equipped with air chambers to keep them from sinking even when filled with water and loaded with rowers. A transporting carriage, on which the boat rests, facilitates launching in a heavy sea. The first lifeboat was invented in 1785. For over fifty years prior to 1851, a boat invented by Henry Greathead was almost the only one in use.



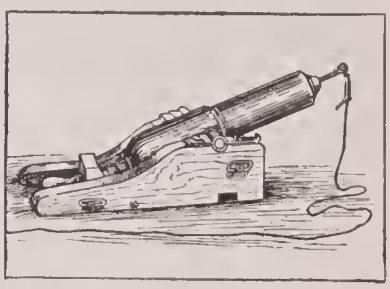
LIFEBOAT AND CREW

In case of heavy seas the boat may be drawn by horses to a place along the shore from which a call for help has come. The smaller illustration shows method of launching.

In the United States Life-Saving Service there is used a power lifeboat thirty-six feet long and over eight and a half feet wide at the broadest portion, which develops a speed of about nine miles an hour. This boat is equipped with sails and oars, besides a gasoline engine, the oars being provided for cases of emergency. The vessel has all the characteristic features of the modern oar-propelled boat, for it is self-baling and self-righting, and the engine, which is enclosed in a water-tight compartment, stops automatically in case the boat capsizes.

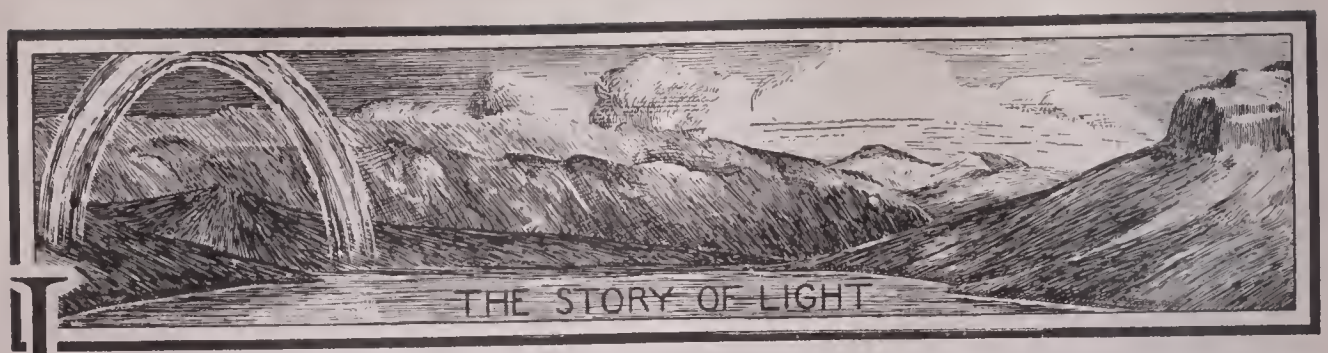
Life Buoy, a device for keeping persons afloat. The commonest type of buoy is a canvas belt filled with cork, which the wearer fastens about his body under the arms. It should be buoyant enough to support at least two persons for a considerable time. Another style of buoy consists of a sort of jacket, constructed of plates of cork held together by a stout casing. Each of these buoys is commonly known as a *life preserver,* and no passenger vessel or freight boat may sail without such equipment. Since such disasters as the *General Slocum* fire in New York and the *Titanic* loss laws relating to number and quality of life buoys have become more strict. There must be on all vessels as many life preservers as there are people aboard.

Life-Saving Gun and Rocket. Each life-saving station is now equipped with a small mortar capable of hurling an arrowlike projectile or other missile from the shore to a vessel in distress. The projectile carries a light rope, with which the ship's crew can haul a heavy hawser aboard. When this has been accomplished, passengers and crew may be conveyed to safety by means of the breeches-buoy, traveling over the line. A rocket is often substituted for a gun. At its head it carries a coil of rope, which runs out as the rocket approaches its object. Some of the guns used have a range of 700 yards, and the more powerful rockets can reach objects 1,000 yards distant.



GUN AND ROCKET

LIG'AMENT, in anatomy, a band of tough, white, flexible tissue, which serves to hold the ends of bones together and keep them in their relative positions. They are strong and pliable, but cannot be stretched unless the muscles and cords about a joint are severed. When the bones of a joint are pulled apart the ligaments are torn, and until they are healed the limb can be moved very little. A sprain is an injury in which the ligaments are torn or twisted, but where there is no dislocation of the bones. Torn ligaments require a long time to heal, and a period of complete rest must always follow a severe sprain. Those persons who have shallow sockets in the ball-and-socket joints are provided with long ligaments which enable them to twist themselves into some remarkable positions. Such persons make good acrobats.



LIGHT. In the first chapter of *Genesis* there is told in the simple language of the Scriptures the story of the creation of light:

> And God said, Let there be light: and there was light.
>
> And God saw the light, that it was good: and God divided the light from the darkness.
>
> And God called the light Day, and the darkness He called Night. And the evening and the morning were the first day.

When this was written, and for many centuries afterward, men knew little about light except that it was "good," and that its principal source was the sun, which Shakespeare in *Twelfth Night* calls—

> That orbed continent, the fire
> That severs day from night.

Even such wise men as Plato and Euclid, who lived about three centuries before Christ, thought that light traveled from the eye of the observer to an object, rather than in the reverse direction. The law of reflection (see subhead, *Reflection of Light,* below), however, was known both to the ancient Greeks and to the Arabs.

What Is Light? Through the Middle Ages and far into the modern period men were seeking the scientific explanation of the nature of light. Sir Isaac Newton (1642-1727), the discoverer of the law of gravitation, advanced the theory that light consists of minute particles of matter emitted in straight lines from a luminous body. Scientists who followed him discovered that many of the known phenomena connected with light disproved this explanation, and in the opening years of the nineteenth century the "wave-motion" theory, now generally accepted, was established by an Englishman named Thomas Young. To understand this theory we must know something about another belief that scientists accept almost universally—that all space is filled with a substance called *ether.*

The ether theory came about in this way: It was known that energy in the form of light and heat is transmitted from the sun and other glowing bodies, and that it can pass through space containing no air (a vacuum) as readily as through air. Clearly there must be some medium by which it is transferred from one place to another, and scientists have assumed that all space not occupied by matter is filled with such a medium. It is believed that this substance, to which the name *ether* is applied, is very elastic, that it cannot be compressed, and that masses of ordinary matter can pass readily through it. When a body is heated to a certain degree its vibrating molecules communicate their motion to the ether, and the resulting disturbances are sent through it in the form of waves which travel in every direction. The energy thus transferred is called *radiant energy.* We may now state the scientist's definition of light: *It is that portion of radiant energy that is capable of producing the effect of vision.* That is, light waves, consisting of vibrations in the ether sent out by a luminous (light-giving) body, strike the retina of the eye, cause the optic nerve to vibrate and produce the sensation of sight. In light waves, as in water waves, the vibration is perpendicular to the direction in which the waves travel.

Luminous bodies like the sun and stars are *natural* sources of light; the carbon of an electric lamp, which the electric current makes extremely hot, is an example of an *artificial* luminous body. Objects not in themselves luminous, such as the pieces of furniture in a room, become visible because of the light that they send to the eye of the observer, but this light is received from some luminous body. Light is itself invisible, though it has the power of dispelling darkness. This is shown in the well-known phenomenon of a sunbeam entering a darkened room. We see its path because the dust particles floating in the air reflect the sun's light. Were the air in the room absolutely free from dust the path of the sunbeam could not be seen. Also, when one sails far up in a balloon, where the air is practically clear, it grows dark and the stars can be seen.

Length of Light Waves. Heat waves as well as light waves are transmitted from a glowing body, and the only difference between these is their length, the average heat wave being longer than the average light wave. The longest light waves are those that produce red light and the shortest those that produce violet light. The red waves and violet waves are therefore the two extremes of the range of vision of the normal human eye. Waves that are longer than those producing red light effect the skin and cause the sensation of heat; those shorter than violet rays bring about certain chemical changes. They affect the sensitive plate of the camera and make possible the photographing of objects not visible to the eye; they fade artificial coloring matters, assist in plant growth, destroy disease germs and cause sunburn and tan.

The vibrating molecules that start ether waves have a frequency of vibration beyond the power of the mind to grasp. The shorter waves have a greater number of vibrations per second than the longer, though all travel at the same rate of speed. Blue waves, for instance, which are much shorter than red waves, have a vibration frequency of 600 trillions a second.

Speed of Light. If we could travel to the sun, which is about 93,000,000 miles away, in an airship having the same velocity as light, we would make the trip in eight minutes and nineteen seconds. Light travels through space at an amazing speed, about 186,000 miles a second. One of the fastest of America's trains runs from Chicago to New York in twenty hours; light can cover the distance, 960 miles, in one two-hundredth of a second. It can readily be seen, therefore, that for all distances on the earth this rate is instantaneous. When we consider that the most distant stars that we can see in the firmament at night are so far away it takes their light about 5,000 years to reach us, we can form some idea of the infinite vastness of the universe. Light travels a little more slowly in air than in a vacuum, and still more slowly through such denser substances as glass and water.

A Straight-Line Advance. Did you ever stop to think why you cannot see around a corner, or why, when looking at an object through a tube, the view of it is cut off if the tube is bent? The reason is that light in passing through a medium of uniform density advances in straight lines. The surveyor knows that he can measure angles exactly because the light which comes from a distant object to his instrument follows a straight path. Upon this fact also depends the forming of a shadow when a body obstructs the passage of light. If a screen through which light cannot pass is placed between a lamp and a wall, for instance, that part of the wall opposite the screen will be in the shadow. The light waves, traveling in a straight line, strike the obstructing body; some of the waves are reflected back to the eye and the rest are absorbed, but none can pass out of their course and around the screen. Hence the unilluminated space behind it.

Transmission through Substances. An object like that described in the preceding paragraph, which cuts off light waves from a luminous body by absorbing them, is called *opaque;* light cannot pass through it. Some substances, such as glass, transmit it so easily that we can see clearly objects through them. We call such bodies transparent. Other substances, such as oiled paper, transmit light imperfectly, and objects are seen through them dimly. They are known as *translucent.* There is no sharp dividing line in the use of these terms, for the same substance under different conditions may be transparent and opaque, opaque and translucent, etc. Goldleaf, for example, though ordinarily opaque, can be made so thin that one can see through it; the water in a clean, shallow pond is transparent, but that in a deep lake is often opaque. Familiar examples of this fact can be multiplied.

Intensity of Illumination. A person makes a practical application of one of the laws of light every time he moves a chair nearer to the window or to a lamp so a better light may fall on the book he is reading. This law may be stated as follows: *The intensity of light decreases as the square of the distance increases.* Stated another way, an electric globe two feet from an object will throw four times as much light upon the object as when it is four feet away, and sixteen times as much as when it is eight feet away.

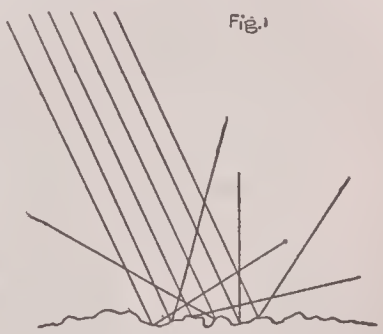


Fig. 1

Reflection of Light. We have already learned that bodies become visible by the light which they send back, or *reflect,* to the eye. Reflection is defined as the *turning back of light waves, by the substance upon which they strike, into the medium through which*

they come. In this connection it is customary to use the term *ray* to designate the path along which the waves travel. We can see bodies with a rough surface readily because the light rays are reflected irregularly, or diffused (see Fig. 1). That is, the reflected rays are scattered in every direction, and the body can be seen from any point.

When the surface of an object is very smooth, like that of a mirror, little if any light is diffused. Instead, most of the rays are reflected regularly and uniformly in a definite direction, and the light seems to come to the eye from distant objects instead of from the reflecting surface. That is why one sees his own image in a mirror, while the latter is itself invisible. In every case the image appears to be as far behind the mirror as the object is in front of it. In Fig. 2, let *A B* be an arrow held in front of the mirror *m n*. Rays of light from the point *A* strike upon the mirror at *D*, are reflected and enter the eye as if they came from *A'*. Rays from *B* seem to come from *B'*. The image, because it is seen in the direction of the reflected rays, appears at *A'B'*, which is as far behind *m n* as the arrow is in front of it. Such an image is known as *virtual*, because it has no actual existence apart from the eye of the observer.

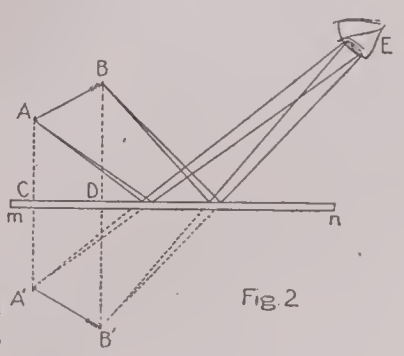


Fig. 2

The angle at which a ray strikes a reflecting surface is called the *angle of incidence*, and that at which it is sent back is called the *angle of reflection*. Comparing these angles, scientists have discovered the law of reflection, as follows: *The angle of incidence is equal to the angle of reflection* (see Fig. 3). It is interesting to note that the reflected ray has the same relative position as the striking ray, just as a ball thrown against a wall at an acute angle bounds away from the wall at the same angle.

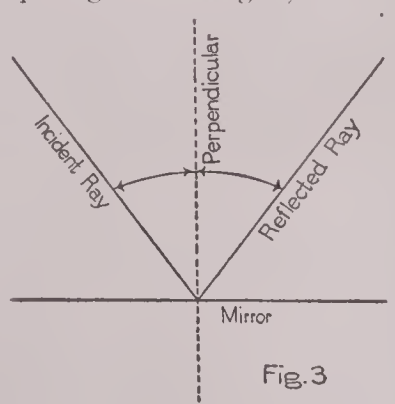


Fig. 3

Refraction of Light. We know that light travels in a straight line so long as it is passing through any one medium. Let us see what happens when a ray strikes a medium of a different density than the one in which it started. The straw through which you drink your lemonade looks bent at the surface of the liquid, and so does the spoon in a cup of clear tea. This is because light is bent or *refracted* from its straight course when passing from one medium to another of different density. There are two important laws to remember in connection with refraction:

(1) When light passes from a rare to a dense medium, it is bent in the direction of a line perpendicular to the surface of the refracting body.

(2) When it passes from a dense to a rare medium it is bent away from such a line.

These laws are illustrated in Fig. 4, which shows the path of rays through a windowpane. When a ray enters the glass it is refracted *toward* the perpendicular, and on leaving, is bent *from* the perpendicular; if the glass is clear the refraction is equal in both directions, and the objects seen through it appear natural. An uneven glass, by causing unequal refraction, would make the objects appear distorted.

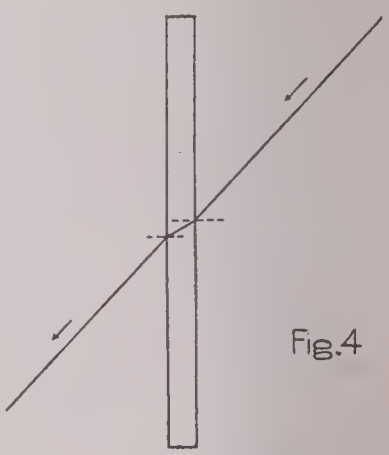


Fig. 4

In nature we see many examples of the principles of refraction. A mirage in the desert is often caused by the bending of the light rays as they pass from denser to rarer layers of air. The setting sun is viewed after the glowing orb has passed below the horizon, for the rays from it which reach the eye are bent downward, as they pass through the atmosphere of the earth, while the eye follows them back in a straight line. For the same reason we see the sun in the early dawn before it is really above the horizon. Rainbows are caused by refraction and reflection. Another illustration of refraction is the wavy appearance of hot air rising above a stove; the rays of light are bent as they pass through layers of air of varying densities. Again, if you look at a clear stretch of water from the side the bottom will seem to be raised, giving the effect of shallowness. This is due to the bending of the light rays as they pass from beneath the water into the air.

The Spectrum. One of the most beautiful of all natural phenomena is the bow of fairy-like colors that spreads across the sky when the sun shines on a mist or a shower of rain. Sir Walter Scott, in *Marmion,* asks—

> What skilful limner e'er would choose
> To paint the rainbow's varying hues,
> Unless to mortal it were given
> To dip his brush in dyes of heaven?

It was not until late in the seventeenth century that even scientists understood the cause of the rainbow, at which mankind had wondered since the day when God "set His bow in the heavens." To Sir Isaac Newton is due the honor of the explanation. He showed that all the colors of the rainbow are the component parts of white light, and that the bow is caused by the refraction and reflection of the sun's rays when they strike the drops of water at certain angles.

Fig 5 shows how Newton produced a band of colors similar to those of the rainbow. He

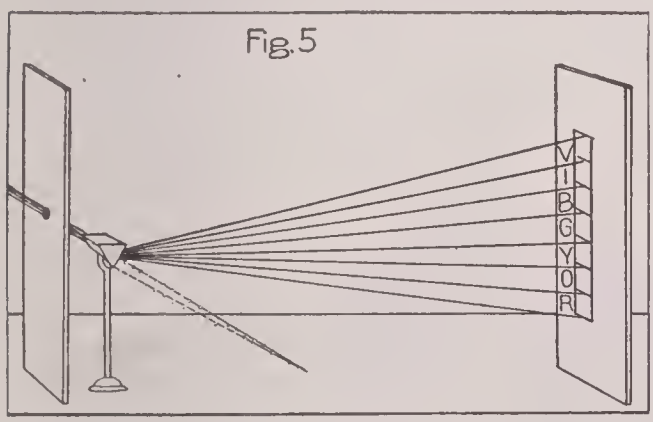


Fig. 5

admitted a beam of sunlight through a small hole in the shutter of a darkened room, and in the path of the beam placed a glass prism and a white screen. The light in passing through such a prism is both refracted and spread out, appearing on the screen as a band of colors arranged in the following order: violet, indigo, blue, green, yellow, orange, red. Such a band of colors is called a *spectrum.* The order of the colors in the spectrum may be remembered by combining their initial letters into the "word" *vibgyor.* C.R.M.

Related Subjects. The following articles in these volumes will be of interest in connection with a study of light:

Aberration	Ether
Camera	Fluorescence
Color	Gas
Diffraction	Lamp
Electric Light	Lens
Electromagnetic Theory of Light	Limelight
	Microscope
Mirage	Reflection
Mirror	Spectroscope
Polarization of Light	Spectrum Analysis
Rainbow	Telescope

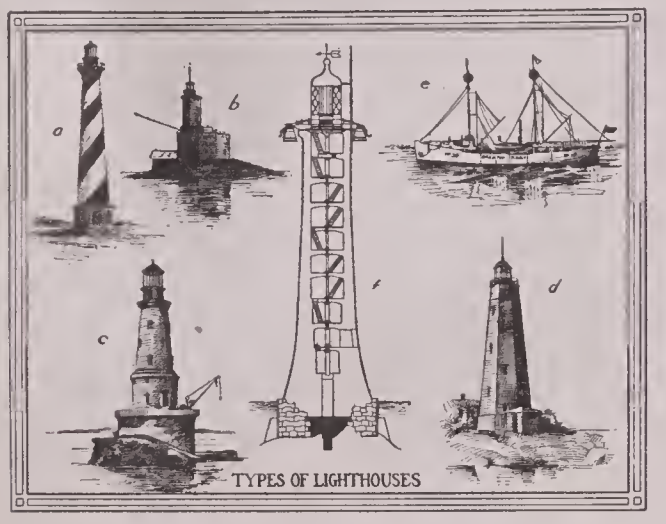
LIGHTHOUSE. The safeguarding of the mariner from rocks and shoals and other perils of the sea, by means of beacon lights, is an old, old story. We may trace the development of the lighthouse from the period when the ancient Libyans erected towers on the northern coast of Egypt, and hung from projecting poles braziers filled with burning fuel, whose light was a signal of warning to the sailor. Classic writers tell of a lighthouse erected about 300 B.C. on the island of Pharos, known as the Pharos of Alexandria, and famed as one of the seven wonders of the ancient world. The Romans built light towers at several ports of the empire, and after the conquest of Britain they safeguarded vessels on the stormy English Channel by erecting lighthouses at Dover and at Boulogne, on the French coast. The tower at Boulogne was a guide to mariners for over fourteen centuries, and was one of many similar structures that protected the navigators of the Middle Ages.

Modern Lighthouses. Lighthouses of to-day not only serve to warn vessels of approach to reefs and shoals, but they are also erected at appropriate points to guide mariners into the entrance of harbors. Some are built on isolated rocks out at sea, some on bluffs or promontories along coasts, and others have their foundations in shallow parts of the sea at long distances from shore. Their construction is therefore determined by their location and the objects for which they are built. Lighthouses exposed to the fury of fierce ocean gales, the constant beating of wind and wave, or the pressure of floating ice, must be solidly built on sure foundations. The tower of stone masonry, nearly cylindrical in form but gradually narrowing from base to top, is typical of many older lighthouses, while huge, cylindrical towers of steel, bolted into solid rock or constructed on foundations of stone or concrete are representative of later designs. Stone, brickwork, concrete, structural cast iron, steel and timber have all been employed in lighthouse building.

On land sites, where there is ample space about the tower, the keeper's quarters, workshop, storage rooms, etc., are in adjoining buildings, but the various compartments are housed in one structure when the light station is built out at sea. Occupants pass from room to room by means of a winding staircase. The

keepers of lights far from the mainland sometimes lead very lonely lives, and their faithfulness and heroism have often been praised in song and story. Nothing more inspiring, however, has ever been written than the true story of Grace Darling, whose father kept the lighthouse on Longstone, one of the Farne Islands, and who risked her life to save the survivors of a wreck on a neighboring reef.

Great light towers, standing like sentinels at the danger points of the ocean, make an irresistible appeal to the imagination. Such a



(*a*) Cape Hatteras light station, North Carolina.
(*b*) Saint George's Reef light station, California.
(*c*) "Rock of Ages" light, Lake Superior.
(*d*) Sandy Hook light, New York.
(*e*) Brenton Reef lightship, off Newport, R. I.
(*f*) Eddystone lighthouse, cross section view. The living rooms are near the top; the bedrooms are on the floor below the light.

lighthouse is the one which stands on Inchcape or Bell Rock, off the east coast of Scotland, on a dangerous reef in the North Sea, twelve miles from land. The lighthouse was completed in 1810, and there is a tradition that long before it was built sailors were warned of their approach to the danger point by the tolling of a bell, which had been placed on a buoy by the good abbot of Aberbrothok. In Southey's famous poem, *The Inchcape Rock,* this legend is told in thrilling verse.

The rock on which the Bell lighthouse stands projects only a few feet above the water at low tide, and when the builders began the work of clearing the seaweed from the surface they were forced to lie flat every few minutes and cling to the weeds in order to keep from being washed into the sea by the waves. After the top was cleared, holes were drilled into the rock, iron rods were driven into them, and around the rods was built a strong iron platform. Upon this the lighthouse, 115 feet high, was built.

The construction of the new lighthouse at Beachy Head, on the southern coast of England, was attended with equal difficulty. This tower was built at the foot of a high cliff and out in the open sea. A great hole was made in the sea bottom, and at low tide the workers built around the hole a thick, high wall, forming an enclosure which was at all times protected from the sea. Within it were laid the foundations of the lighthouse. A strong iron platform, resembling a short pier, was built in the sea as a workshop. Strong wire ropes carried men, tools and materials from the top of the cliff to the platform and back again, and the blocks of granite which formed the stonework of the tower were all shaped and fitted on land before they were permanently joined together. It will thus be seen that lighthouse building presents many engineering problems, and could the story of every light tower be told one might read a series of narratives of absorbing interest.

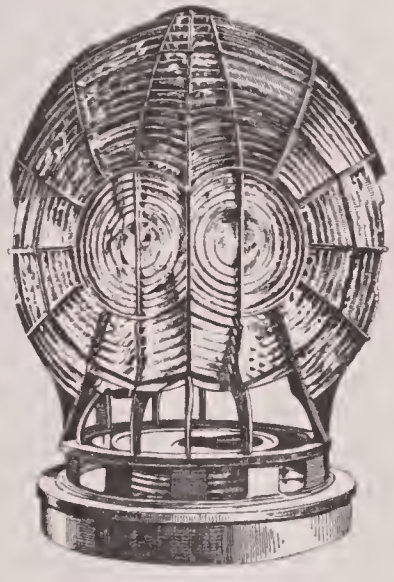
The Light. Inasmuch as the tower is erected solely for the purpose of giving out light, the lantern with its enclosed lamp is the most important part of the structure. In lighthouses of modern construction the lantern consists of a light, metallic frame which holds in position a series of lenses (see LENS). These form its sides. The largest lanterns are usually about twelve feet in diameter and ten feet high, and their light can be seen over the water for a distance of twenty miles or more. The number of sides or faces depends upon the style of light desired, this number varying from two to eight. The center of each face contains a large plano-convex lens which is surrounded by a number of rings of prisms, so constructed as to reflect in parallel lines all rays of light which strike them. In the large lights the number of these prisms runs into the thousands.

The lantern is mounted on a carriage which moves on rollers or is floated in a tank of mercury. When in use it is made to revolve by clockwork, which is kept in motion by a suspended weight. A beam of light can be seen only when a face of the lantern is directly opposite the observer; therefore when the lantern revolves it gives out as many flashes as it has sides. By covering any side with colored glass a light of corresponding color can be seen. Lighthouses show various kinds of signals, including besides the flashing light the *intermittent,* or *occulting* light, which is suddenly turned on and off at varying intervals; the

group flashing light, where two or more flashes are followed by an eclipse of several seconds; fixed lights, and others. The United States government has arranged a code whereby the number of flashes, exact time of revolution and relative number of red and white flashes of a given signal are recorded and numbered, and the lighthouse corresponding to any number may be found by the mariner in the *Light Lists* which he carries with him. These *Lists* are published by the Lighthouse Board.

In the earliest lighthouses wood or coal burned in braziers provided illumination, but modern sources of light consist of mineral oils (chiefly petroleum), coal and oil gas, acetylene and electricity. Kerosene is the illuminant used in the majority of United States coast stations, but one of the most powerful lights maintained by the Lighthouse Board is that at Navesink, at the entrance to New York Bay, which consists of an electric arc with an estimated candle power of 25,000,000; this apparatus flashes a white signal every five seconds.

Some Notable Lighthouses. The Eddystone Lighthouse, one of the most famous in the world, stands upon a dangerous reef in the English Channel. It is 132 feet high from high-water level to the focal plane of the lantern and is built of stones cut so as to interlock. A light tower of unusual height was constructed at One Fathom Bank, on the Strait of Malacca, in 1908, the light being raised on a superstructure 925 feet above the water. The foundation was laid on piles, which were driven through the sand to firmer material below. Among the notable lighthouses on the North American coast are those at Minot's Ledge, in Massachusetts Bay; Spectacle Reef, in Northern Lake Huron; Tillamook Rock, in the Pacific Ocean, twenty miles south of the Columbia River; and the great tower at Barnegat, New Jersey, which is equipped with a lens having a bull's-eye in the center eighteen inches in diameter. Were it not for the curvature of the earth's surface, its powerful light, equal to 30,000,000 candle power, could be seen by sailors 100 miles from shore. The new Kilauea Point Lighthouse, on one of the Hawaiian Islands, is also notable for its lens, which is twelve feet high and weighs four tons.



ONE OF THE WORLD'S GREATEST LENSES

It is twelve feet high, weighs four tons, and was made in France at a cost of $12,000. This lens is in a lighthouse in Hawaii, completed in 1917. It revolves on a mercury float, and its light, 940,000 candle power, is visible twenty-five miles.

Lightships. These are in effect floating lighthouses. Vessels equipped with signal lights are stationed at dangerous points off coasts, at approaches to harbors and at other places where lighthouses cannot be built. Ships of the most modern design carry a steel lantern mast large enough to contain a ladder by which access is obtained to the lantern. The latter is constructed on the same principle as the illuminating apparatus of a lighthouse. Powerful fog signals are also a part of the equipment. More than forty lightships guard the coasts of the United States; the light vessel anchored on the dangerous South shoal, twenty-six miles off Nantucket Island, is farther from shore than any other such ship in the world. Buoys and beacons are also placed in narrow sounds, rivers and estuaries, where the danger to navigation is not great enough to warrant the construction of lighthouses or the anchoring of lightships.

Lighthouse Service. Practically every nation with coast waters maintains a lighthouse service. The United States Lighthouse Board constitutes a bureau of the Department of Commerce. The Canadian service is under the direction of the Department of Marine, and in England the lights are in the care of Trinity House Corporation. The Scottish lights are managed by the Commissioners of Northern Lights, and those of Ireland are cared for by the Corporation for Preserving and Improving the Port of Dublin. The lighthouse board of France, known as the Commission of Phares, is under the direction of the Minister of Public Works. In Denmark, Austria, Holland, Russia, Sweden and Norway the lighting of the coasts is under the care of the Minister of Marine, and in Belgium the lighthouse service is controlled by the Department of Public Works. B.M.W.

LIGHT'NING, a flash of light in the sky caused by electrical discharge between clouds, or between clouds and the earth. Lightning is one of the most mysterious and least understood of natural phenomena. Centuries ago the ancient Greeks and Romans felt the mys-

tery and the danger of lightning and thunder; they believed that these were weapons in the hands of Zeus, or Jupiter. So powerful and so deadly were these weapons that they could belong only to Jupiter, greatest of the gods. Modern science has removed much of the mystery surrounding lightning, and has proved that lightning is really atmospheric electricity.

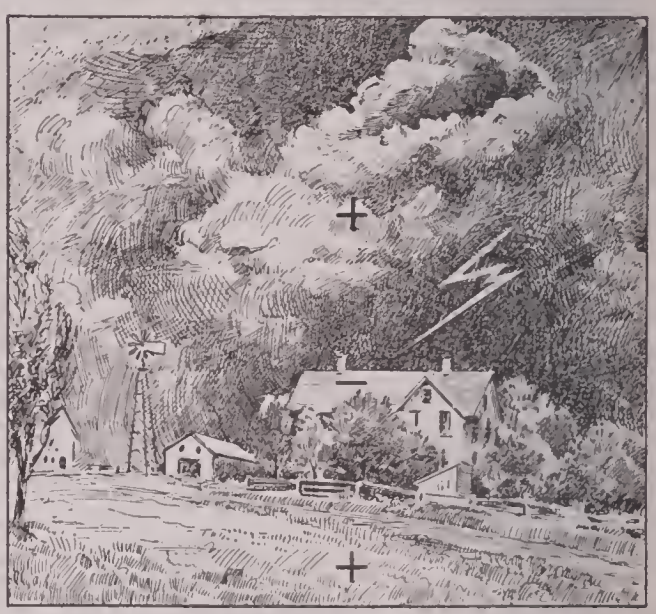
It was Benjamin Franklin who first showed the identity of electricity and lightning. He made a silk kite, near the top of which he fastened a piece of wire. He next attached a long string to the kite, tied an iron key to the free end of the string and fastened a silk ribbon to the key. Silk is not a conductor of electricity. One day in a heavy thunderstorm he sent up the kite. The first thundercloud passed without any apparent effect, but as a second one came near the kite he saw that the loose ends of the string stiffened. He put his hand near the key and instantly felt a shock as a tiny spark bridged the space from the key to his finger. Rain then fell heavily and the wet kite string carried so heavy a current of electricity that Franklin charged a Leyden jar (which see).

What Causes Lightning? Franklin first proved that lightning is electricity, and then showed by experiments that the electricity in the clouds is both positive and negative, exactly as some bodies on earth, when electrified, produce positive or negative electricity. The earth's surface as a whole is charged with negative electricity, whereas most of the clouds are charged with positive. The difference between these two kinds of electricity is chiefly a difference in condition rather than in nature, as explained in the article ELECTRICITY.

The important point to remember is that positive and negative charges of electricity mutually attract each other. Nobody knows why this is true; scientists have merely learned it by experiment. The air, however, is a nonconductor, that is, it does not hold electricity, and as the winds blow the clouds here and there the different charges of electricity seek a weak spot in the wall of air separating them. When this weak spot is found the electricity jumps across the space with a flash which is called *lightning*. A flash of lightning is exactly like a spark from a Leyden jar or from any other charged body.

Perhaps the lightning flash will be more easily understood by comparison with water. Let the reader imagine that a dam is placed in such a way that it prevents two rivers from making a junction; then imagine the shower of spray which will rise when the dam suddenly breaks. When two clouds, or the earth and a cloud, get so close together that there is an electrical discharge, there is a shower of sparks. Very few people realize that a flash of lightning is really a succession or shower of flashes so close together that they seem like one to the naked eye.

All electrical discharges are alternating, that is, every spark is followed by a pause. These intervals between sparks vary from a few thousandths to a few millionths of a second

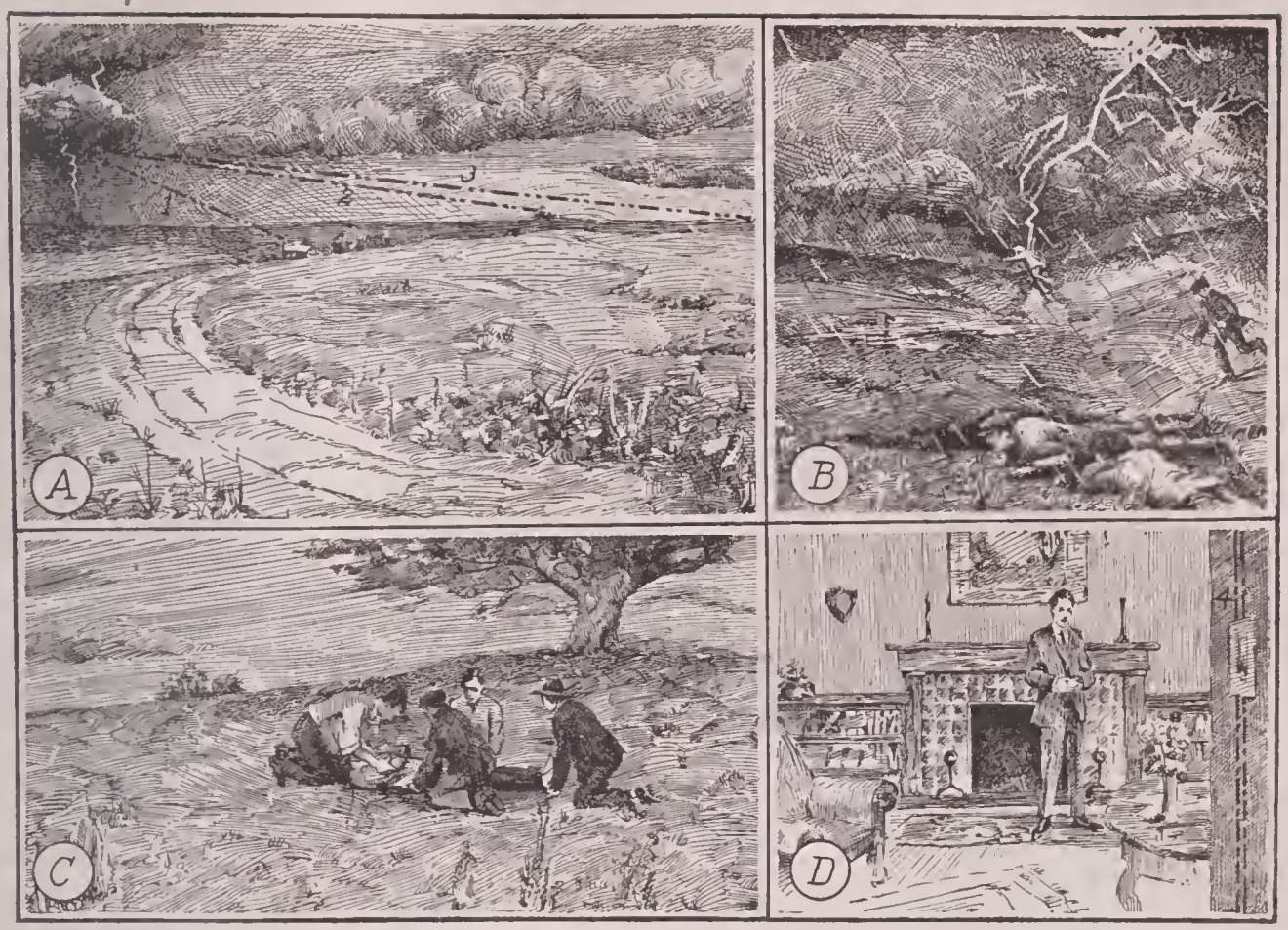


POSITIVE AND NEGATIVE ELECTRICITY

Lightning is an electric discharge between two clouds, one electrified positively and the other negatively, or between a cloud and the earth. Positive electrification is indicated above by the sign +; negative, by the sign −.

in length. Lightning is a discharge of electricity from countless millions of electrified particles in the clouds or on the earth, and a flash is made up of these countless sparks which all occur at the same time. This mixture of sparks and pauses causes the flickering or vibrating appearance which is frequently noticed in lightning.

Why Are Clouds Charged with Electricity? While it is clear that lightning is caused by electricity in the clouds, yet the question arises, "Why are clouds charged with electricity?" Nobody has yet explained to everybody's satisfaction what electricity itself is, and nobody has yet proved why it is found in the clouds. Scientists have said that it is due to friction in the air caused by floating particles of dust, or to friction caused by snowflakes and particles of water in the upper layers of clouds. It has also been suggested that it is in some way the result of the evapora-



HOW TO AVOID BEING STRUCK BY LIGHTNING

(*A*) Distance from storm. It takes five seconds for the noise of thunder to travel one mile; (1) is two and a half seconds, or half a mile, and is safe for the time being; (2) is the safe distance of a mile, and (3) is two miles.

(*B*) If caught on open ground, lie flat. It is dangerous to stand or run.

(*C*) Treat a person who has been struck by lightning in the same way as one who has been nearly drowned (see DROWNING).

(*D*) In a thunderstorm avoid placing yourself between two conductors such as a gas main (4) and the fireplace.

tion of water from the surface of oceans, lakes and streams, but this theory has not won much support. A more probable explanation is that electricity in the air is due to the constant bombardment of the outer layers of air by hosts of electrified particles, called *electrons,* issuing with enormous velocity from the sun.

Kinds of Lightning. There are three recognized forms of lightning, the first of which is called *forked, zigzag* or *chain lightning.* This is a line of brilliant light; it usually appears zigzag to the eye, but in fact is winding like a river. The single streak often breaks into several branches or forks. The second kind is called *sheet lightning.* This has no particular form, but is usually a bright flash which spreads uniformly over the horizon and lights up the skies. Sheet lightning is really the illumination in the sky due to zigzag or chain lightning which is itself beyond the horizon or is for some other reason invisible to the eye. *Heat lightning,* frequently seen on summer evenings, is practically the same as sheet lightning. The third form of lightning is called *ball lightning.* Balls of fire, a foot or two in diameter, descend slowly from the clouds, until they strike the earth; sometimes they even roll along over the ground. The ball explodes when it hits the ground or some obstacle, but it does not seem to be very dangerous. Ball lightning is the least understood of all forms, and it is only in recent years that scientists have begun to investigate it; previously it was classed with the sea serpent and other semimythical wonders.

Why Thunder Follows Lightning. The electric discharge, as it breaks its way through the atmosphere, instantaneously heats the air in its path. This sudden heating causes a violent expansion of the air along the path of the lightning flash, and a violent compression of the cool air farther away. This process starts a great air wave which is the thunder. When a lightning flash occurs near by, the sharp, crackling reports come from its branches, and the heavy crash comes from the trunk of the flash. The rolling thunder comes from

the more distant part of the trunk, and is continued by echoes among the clouds. Light travels 186,000 miles per second, a rate practically instantaneous. Sound, on the other hand, is slow, traveling at the rate of only about 1,100 feet per second. By counting the time interval between the flash and the thunder, an observer can tell how far distant is the flash. This interval is seldom more than seventy or eighty seconds. Because of the refraction of sound as it makes its way through the atmosphere, the sound of thunder begins very soon to rise from the ground, and at a distance of fifteen miles can seldom be heard on the earth's surface. It takes a sound wave about eighty seconds to travel fifteen or sixteen miles.

Protection Against Lightning. Lightning in its course to the earth is likely to follow such convenient tall objects as trees, the steeples of churches and the chimneys of houses. According to statistics lightning strikes oaks more often and beeches less often than any other trees. It is also true that single trees standing apart from any other tall objects are more likely to attract lightning than any one tree, no matter what variety, in a forest. It is well to protect buildings with rods, which should be fastened to the roof and any projecting points. The rods should be sunk so low into the earth as to rest in soil which is always damp, or they should be connected with waterpipes or gaspipes which enter the ground.

A person struck by lightning is usually merely stunned or shocked. The shock may be great enough to stop the action of the heart, but it is well to remember that a person apparently killed may have sustained no serious injury. Respiration may have been stopped by a temporary paralysis, but efforts to restore breathing should be continued for at least an hour. The method used after lightning stroke should be exactly the same as after drowning (which see). C.R.M.

Lightning Rod, a stout iron rod, erected on a building for the purpose of receiving lightning and conducting it into the earth to prevent injury to the structure. It is fastened to a building by passing through glass nonconductors, and the lower end is carried into the ground to a considerable depth. Benjamin Franklin invented the lightning rod in 1752. The principle upon which it was devised is that by putting an electrical conductor far enough above buildings to determine the place of a threatened discharge it will carry a lightning bolt to earth without destructive results. In early days the lightning rod was thought to be an impious interference with the wrath of Heaven, evil in principle and doubly sacrilegious if successful. See LIGHTNING.

LIG'NITE. See COAL, subhead *Varieties.*

LI HUNG CHANG, *le' hoong' chahng'*, (1822-1901), the "Grand Old Man of China," to whom much of that country's progress during the latter half of the nineteenth century was due. He played the most prominent part in all of China's affairs for over forty years, representing his government and extending its foreign relations with great skill and wisdom. He held the highest official rank of any man in China below the emperor —First Grand Secretary of State. He was born of the people —not of high rank—in the year of General Grant's birth, a fact of which he was always proud. In the severe examinations which admit a man to the literary caste in China he passed ahead of 15,000 competitors. He won his great renown in the service of the Tartar dynasty during the T'aiping Rebellion. During his long service as Viceroy of Chi-li he made his home in Tien-tsin, where he carried on labors which won for him the reputation of being the most progressive man in China.

LI HUNG CHANG

During a visit to Europe Li told Bismarck that he had sometimes been called the Bismarck of the East; the great German statesman is said sincerely to have replied, "I never could hope for the honor of being called the Li Hung Chang of the West." When, in June, 1899, Li Hung Chang returned to China after a visit to the United States he received the order of the Double Dragon, a distinction seldom conferred upon anyone not a member of the royal family. He enjoyed his greatest power from 1874 to 1894, when he was Viceroy of the Metropolitan Province, Superintendent of Northern Trade and the undelegated but recognized Minister of Foreign Affairs. Among the evidences of his far-reaching power is the fact that he controlled all the pawnshops in China, and with one exception outside the royal family, was the richest Chinaman.

LILAC, *li'lak,* the popular name given to a familiar shrub of the olive family, whose fragrant white or purple-tinted blossoms are a delightful feature of yards and parks in the spring season. The common lilac is one of the ornamental shrubs most frequently used in landscape gardening, and because of its decorative value is cultivated extensively in North America and in Europe. The plant grows from six to fifteen feet in height and flowers in May, the blossoms, of which there are single and double varieties, appearing in large terminal clusters. This plant thrives almost anywhere, but rich loam is most favorable to its successful growth.

LILIUOKALANI, *le le oo o kah lah' ne,* Lydia Kamekeha (1838-1917), queen of the Hawaiian Islands just previous to the time of their acquisition by the United States. In 1891, on the death of her brother, King Kalakaua, she ascended the throne. Her treatment of non-naturalized whites caused a revolt against her; in 1894 she was deposed and a republic was proclaimed. The new government sought annexation to the United States but met with opposition from President Cleveland, who demanded that the queen be restored to her throne. This was refused by Hawaiian leaders. In 1896 Liliuokalani visited America to press her claims, but on the annexation of Hawaii to the United States in 1898, she returned with a good degree of contentment to her private estate in the islands. She has since been friendly towards the American authorities, but never until after a state of war was declared between the United States and Germany, in April, 1917, would she permit the American flag to be flown from her residence.

LILLE, *leel,* a fortified city in the northern part of France, on the River Deule, situated about seven miles south of the Belgian frontier and 155 miles northeast of Paris. It is the capital of the department of Nord. At the outbreak of the War of the Nations (which see) it was a prosperous center of the French iron industry—a city of beautiful squares and boulevards and modern public buildings. During the invasion of Northern France, in the first year of the war, Lille, with scores of other towns, was captured by the Germans and placed under martial law. A war tribute was levied on the inhabitants and large numbers of them were deported into German territory. As the city was long the scene of furious fighting between the Germans on the one hand and the French, British and Belgians on the other, many of its public buildings were destroyed by the furious bombardments directed against it. Lille has numerous educational institutions and libraries and one of the largest art museums in France outside of Paris. In normal years its factories turn out great quantities of linen, cotton goods, damask, ribbons and laces, spirits, machinery and tobacco products, and the city also has great printing houses, sugar and oil refineries and dye works. In 1911 the population (including suburbs) was 217,807.

LILY, *lil'i,* the common name of one of the largest and most important of plant families. The word popularly refers to such garden and hothouse flowers as the tiger lily, the Madonna lily, and the beautiful white Easter, Mediterranean, Chinese and Japanese lilies. White lilies in all lands are regarded as emblems of purity and innocence.

Julia C. R. Dorr, a poet of the Southern United States, has given this thought poetic expression in the lines—

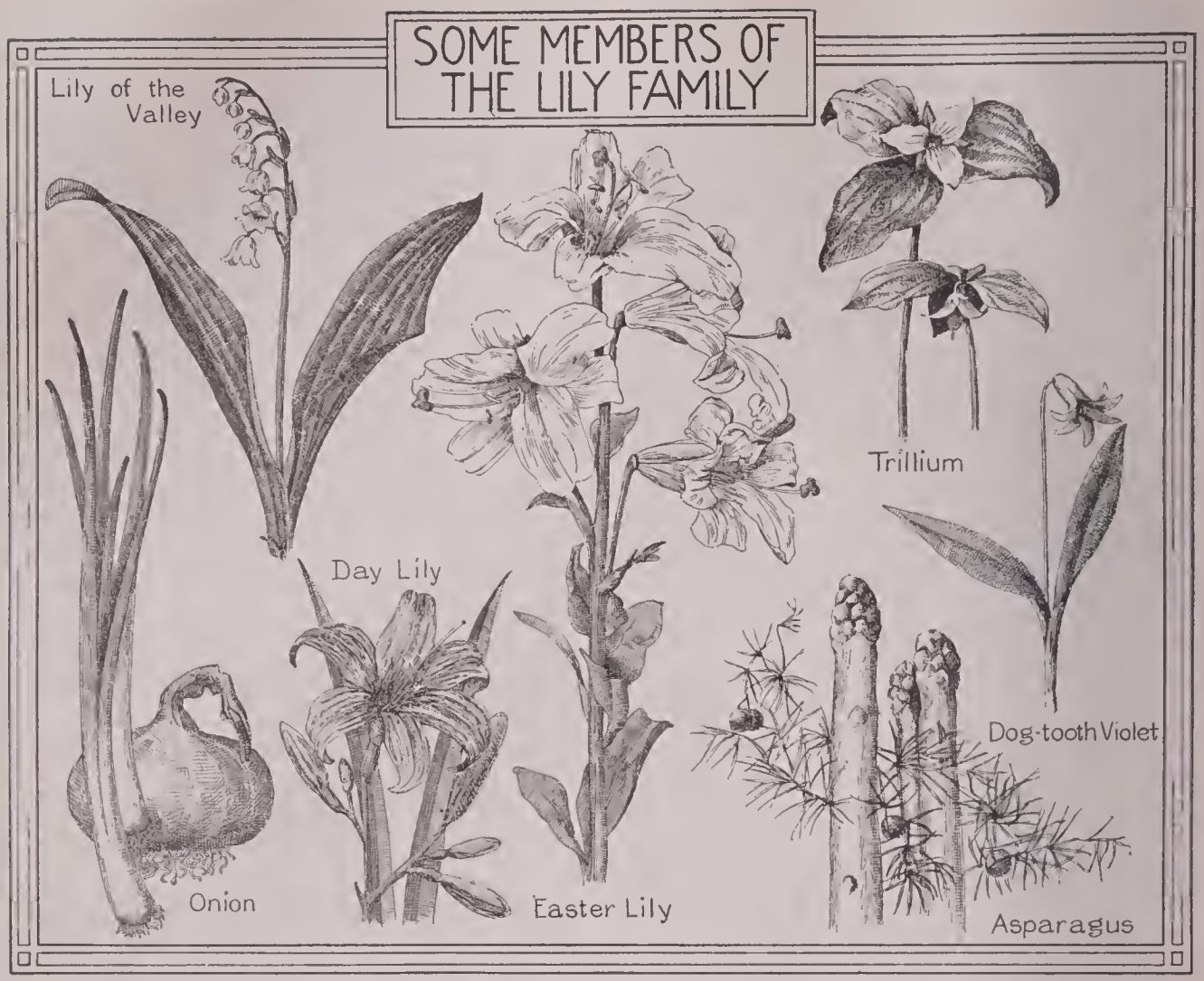
> And the stately lilies stand
> Fair in the silvery light,
> Like saintly vestals, pale in prayer;
> Their pure breath sanctifies the air,
> As its fragrance fills the night.

To this widely-distributed family also belong those commercially and economically important plants commonly known as onion, garlic, leek, asparagus, aloe, and many others. Typical lilies have tubular or bell-shaped flowers of six parts, with petals often backward curving. In the different species the colors vary from white to scarlet, and are evenly colored or mottled with spots of purple or brown.

Lilies grow from scaly bulbs and send forth bare or leafy upright stems, topped with single blossoms, or with several gayly-nodding flowers in a cluster. Well-drained, deep, sandy loam, sheltered from strong winds and hot summer sun, is best for lily culture. The bulb should be planted six inches or more in depth.

Twelve species of lilies are native to the United States. The calla and the water lily are not included among these, for, though called lilies, they belong to very different families. See illustration on page 3432; also the articles Calla; Easter Lily; Water Lily.

LILY OF THE VALLEY, a favorite garden plant of the northern hemisphere, belonging to the lily family. Its drooping, bell-shaped flowers, of a beautiful, pure-white color, are borne in a long cluster on a slender stem, and possess a delightful fragrance. The flower stalk rises from an underground rootstock, and usually



bears two large leaves. It is a perennial plant, flowering naturally in late spring, but blooming in hothouses at all seasons. It thrives in slight shade in a deeply-dug, rich soil containing leaf mold. The lily of the valley, which is the May-flower of the Germans, grows in the woods of Europe and Northern Asia, and in the southern Alleghany region of North America. A French toilet water, called *Eau d'or,* is distilled from the flowers.

LILY OF THE VALLEY

Is not this lily pure?
What fuller can procure
A white so perfect, spotless, clear,
As in this flower doth appear? —QUARLES.

LIMA, *le'ma,* the capital of Peru, is famous in history as the former capital of all Spanish South America, and its name is known even to the uneducated of a great part of the world through the familiar Lima bean, first grown here and named for the city. It is called, poetically, the *City of the Kings*—though it was never the home of any king—being dedicated to the memory of the three "Wise Men of the East" who visited the infant Saviour. The population was said to be 143,500 in 1916.

Lima was founded by Pizarro, the Spanish conqueror, in 1535, whose remains now lie in the magnificent cathedral (see PIZARRO). The city is near the coast, in an almost rainless region, where the air nevertheless is moist with dews and with vapor from the sea. The climate is delightful except in the winter season, June to September.

The city has suffered periodically since 1683 from destructive earthquakes, that of 1746 being especially memorable. As a consequence of the destruction of the Cathedral of San Francisco in that year, the present edifice is a rebuilt and comparatively-modern structure. The architecture of the city is generally of Andalusian type, with Moorish features. There are scores of churches, rich in costly decoration. The Palace, or government building, progres-

sively constructed, is filled with the accumulated memorials of four centuries and is especially interesting for its great collection of portraits of historic characters. In one of its *patios* (courtyards of buildings) is an ancient fig tree which Pizarro himself planted.

Music, art and belles-lettres are liberally patronized in Lima. The language of the upper class is that of the best circles in Madrid or in Castile. The bullfight, barely tolerated, will soon be seen here no more. Nowhere in South America are Spanish-American character and culture more thoroughly appreciated and esteemed by the representative foreign element than here. The retail trade of Lima is largely in the hands of Italians, who are numerous in the city. There are many Americanized Chinese families, some of which are wealthy and have long been residents of the city.

The Chamber of Commerce is representative of both native and foreign business men, and it exerts a strong influence on the fiscal policy of the nation. Modern sanitation has begun in Lima. The clubs of the city are exclusive and maintain a high standard for membership. The authorized lottery, with public drawings weekly on the Plaza, helps to support the city's charities. The Botanical Garden and the statues of Bolivar, San Martin, Columbus and others are among the attractions of the city. H.M.S.

LIMA, *li'ma,* Ohio, the county seat of Allen County, situated in a rich oil section in the northwestern part of the state, and on the Ottawa River. The city is eighty-one miles south of Toledo and seventy-one miles north of Dayton, and is on the Cincinnati, Hamilton & Dayton, the Detroit, Toledo & Ironton, the Erie, the Lake Erie & Western and the Pennsylvania railroads. It is served by a number of interurban electric lines. The area is five and one-half square miles. The population was 30,508 in 1910; it was 35,384 in 1916, by Federal estimate.

Lima is the seat of Lima College (Lutheran) and of the Ohio State Hospital for the Criminal Insane, which is one of the largest institutions of its kind in the world. In the vicinity are oil wells and refineries, from which vast quantities of oil are shipped. The city has large manufactories of locomotives, cars and machinery, and railroad shops.

LIME, the fruit of a small tree belonging to the rue family, closely related to the lemon. The tree has a crooked trunk, from which spring irregular, spreading branches; it rarely grows higher than eight feet. It has smooth, glossy leaves, like the lemon tree, and the fruit has much the same shape and color as the lemon, but is smaller, more rounded and more sour. The lime tree is a native of India and China, but is cultivated for its fruit in Southern Europe, the West Indies and the southern parts of America. Limes sold in American markets are produced chiefly in Florida and the West Indies. Though the tree grows well in California it is little cultivated there because of its extensive growth in Mexico and the cheapness of the Mexican product. The sharp-biting juice of this lemon-like fruit is the main source of citric acid; it is also much used in making a cooling drink called *limeade,* and as a flavoring. On shipboard it is recommended as a preventive of scurvy. See Lemon.

LIME, a coarse, white, solid substance, formed by "burning" limestone in kilns. Lime is hard and brittle and it will withstand a high degree of heat; however, it can be melted in the intense heat of the electric furnace. Lime has strong alkaline properties; that is, it acts on vegetable and animal substances in the same way that caustic soda and potash do. For this reason it is commonly called *quicklime.* If water is poured upon it lime swells and changes to a fine white powder, forming *slaked lime.* During the process sufficient heat is given off to boil the water. A similar change takes place when lime is exposed to the air for a number of days. The lime absorbs water and carbon dioxide from the atmosphere, forming air-slaked lime, but this lime is worthless for most of the purposes for which water-slaked lime is used.

In the manufacture of lime, the limestone, broken into fragments, is put in at the top of the kiln and the lime is taken out at the bottom. The fire is kept up day and night, and the process may continue for days and weeks, the kiln being charged every few hours. Many limekilns still use wood as fuel; others burn coal, coke or gas. A temperature of about 1,800° F. is necessary to decompose the limestone rapidly.

Uses. Being the cheapest of alkaline substances, lime finds numerous applications in the arts. It is used in making mortar, for whitewash, in the manufacture of bleaching powder, which is chloride of lime, in making modern nitrogenous fertilizers, *lime-niter* (calcium nitrate) and *lime-nitrogen* (calcium cyanamide), and in making cements for buildings and pavements. It is also employed for removing the

hair from hides in tanning, for making certain varieties of glass (which see) and certain fungicides, such as *lime-sulphur* and *Bordeaux mixture,* and for restoring the fertility of soils that have become sour or acid. For this last purpose, however, finely-ground limestone is often better than lime itself. When lime is mixed with sand and the mixture is raised to a high temperature the two fuse and form a liquid glass in which many mineral substances will dissolve; for this reason limestone is employed as a flux in smelting iron ore (see IRON).

Chemistry of Lime. Chemically, limestone and air-slaked lime are calcium carbonate; quicklime is calcium oxide; and water-slaked lime is calcium hydroxide. *Limewater* is a solution of water-slaked lime in water, and *milk of lime* is a mixture of limewater with undissolved slaked lime. Limewater is used in medicine and milk of lime in sugar refining, water purification and many other chemical industries. *Hydraulic lime* has the property of hardening under water, hence the name. See CALCIUM; FERTILIZER. J.F.S.

LIMELIGHT, or **OXYHYDROGEN,** *ok si hi' dro jen,* **LIGHT,** a very intense white light, produced when solid lime, or the oxides of magnesium, thorium, etc., are heated to a high temperature. Limelight is produced by heating the lime with what is known as an oxyhydrogen flame; that is, a flame of hydrogen in an atmosphere of oxygen. The burners are so constructed that the gases are mixed as they issue from a tube having an inverted opening; the flame is of a bluish color, and the point strikes the piece of lime, which soon becomes white-hot. Limelight is used in gas mantles, which are made by soaking a cotton web in a calcium (lime) solution. The cotton burns away, leaving the calcium oxide web. It is also used to a limited extent in stereopticons and for producing lighting effects in theaters where electricity cannot be introduced, but for these purposes ordinary illuminating gas takes the place of the hydrogen.

LIMERICK, *lim' er ik,* fourth in importance among the seaports of Ireland and the leading port on the west coast. It is the capital of Limerick County, and is built on both sides of the Shannon River, about 106 miles south-southwest of Dublin. The town is divided into three parts, the English town, Irish town and Newtown-Pery, the latter dating from 1769, now the finest portion of the city. The industries include the curing of bacon, flax spinning and weaving, and lace making.

In the ninth century Limerick was an important Danish settlement and remained so until the Danes were expelled by the Irish two centuries later. In 1174 the town fell into English hands. Limerick was the last stronghold of James II in Ireland. It surrendered to William III in 1691. By the terms of the treaty of Limerick the greater part of the Irish army was permitted to enlist in the military service of France, and the Roman Catholics were guaranteed full religious and political liberty. The violation of the civil part of this treaty during the reigns of William III and Queen Anne, down to the nineteenth century, has given to Limerick the name of the "City of the Violated Treaty." Population in 1911, 38,403.

LIMERICK, a popular nonsense verse of a special form, supposed to have derived its name from the chorus of an old song of that meter in which the city of Limerick is mentioned. It consists of five lines, the first two and the last rhyming, and the third and fourth. The third and fourth are shorter than the other three, as in this example:

> There was a young man who said, "Why
> Can't I look in my ear with my eye?
> If I give my mind to it
> I know I can do it;
> You never can tell till you try."

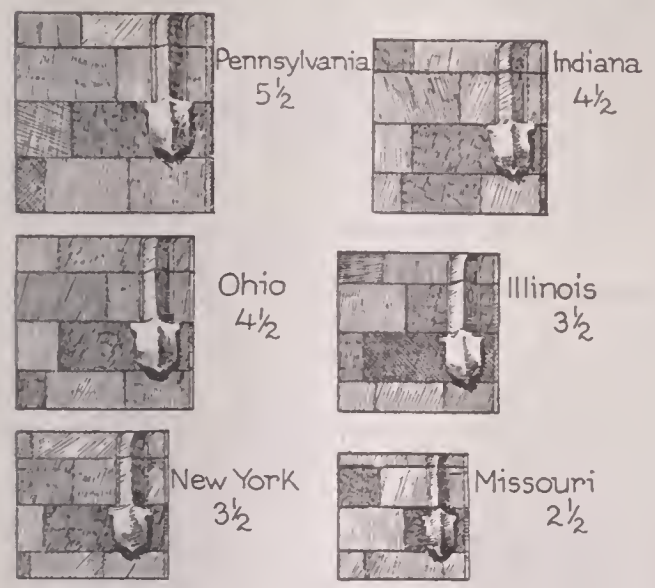
Perhaps the best production thus far in print, embodying in it an unusual play on words, is the following:

> One day the great Brooklyn preacher
> Said "That hen is a wonderful creature."
> When the fowl heard of that
> She laid an egg in his hat,
> And thus did the hen reward Beecher.

LIMESTONE. A large part of the earth's crust is composed of a coarse, gray rock and the soil that has been formed from it. If we put small pieces of this rock into any strong acid, especially muriatic acid, bubbles will rise. These bubbles are carbonic-acid gas, and the stone from which they come is limestone, which is a rock composed of this gas and lime. There are many varieties of limestone, and while most of it is of a grayish color, all colors from white, as in statuary marble, to black may be found. Pure limestone sometimes forms in crystals, which from their resemblance to a dog's teeth are given the name of *dog-tooth spar.* Some limestones are composed almost entirely of fossils; when these have been crystallized by heat they form marble (which see).

Limestone was formed by sediment, settling at the bottom of bodies of still water. It usu-

ally occurs in layers, though these layers may have been thrown out of their original position. It is not so hard as granite, but it is strong and is a good stone for foundations and walls where a fine finish is not required. It is



LIMESTONE QUARRYING

The six American states producing the greatest quantities, the figures representing the average for five years ending in 1916.

used in the manufacture of glass, for making lime (which see) and as a flux in smelting iron ore. The lime combines with other minerals in the ore and sets the iron free. For comparison of the durability of limestone and other stone, see BUILDING STONE. W.F.R.

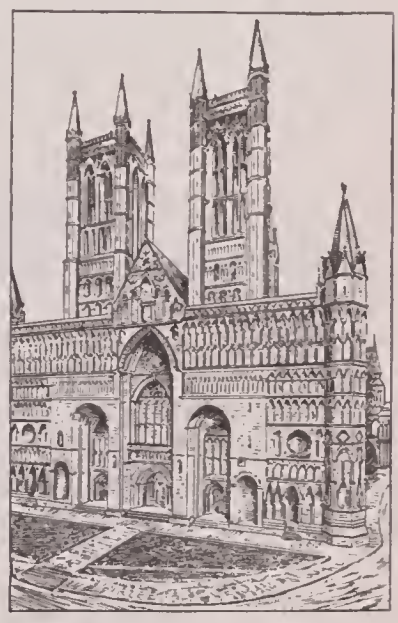
LIMITA'TIONS, STATUTE OF. See subhead, under article DEBT.

LIMOGES, *le mohzh',* in Central France, the famous center of the European porcelain industry, is one of the oldest of French towns. It is the capital of the department (province) of Haute-Vienne, and lies on the Vienne River, 215 miles southwest of Paris. As far back as the Roman conquest (60 B. C.) Limoges was the capital of a Gallic tribe. In the Middle Ages it was famed for its gold ware, and later became a center of the enamel industry. The porcelain industry introduced in the eighteenth century requires the services of 8,000 men. In addition to porcelain factories there are large breweries, distilleries, foundries, paper mills and printing shops; and many people are employed in the manufacture of shoes and clogs. Population, 1911, 92,180.

LIMONITE, *li'mo nite,* or natural *ferric hydrate,* occurs in two forms—bog iron ore and brown hematite. Bog ore is found in marshes and as brown slime in fresh-water lakes, especially in Norway and Sweden, where the gathering and smelting of it is an industry. The hematite is mined in quantities from iron-ore outcrops, particularly in the Appalachian Mountains. Limonite mixed with clay is the basis of ocher and sienna pigments. See HEMATITE.

LIM'PET, a small animal belonging to the mollusks, with an open, conical shell. It is commonly found between the points of high and low tides, clinging to rocks by means of the foot, which acts as a sucker. When the tide is up it searches for food, which consists of different kinds of seaweed, which it gathers into its mouth by means of a long, ribbonlike tongue covered with rows of teeth. As the tide ebbs the limpet returns to its place among the rocks. It clings to objects with such tenacity that a force equal to more than a thousand times its own weight is required to detach it. The common European limpet is eaten by the poorer classes in some parts of Great Britain and is sometimes used as bait by fishermen. Limpets in the tropics grow to be twelve inches in width.

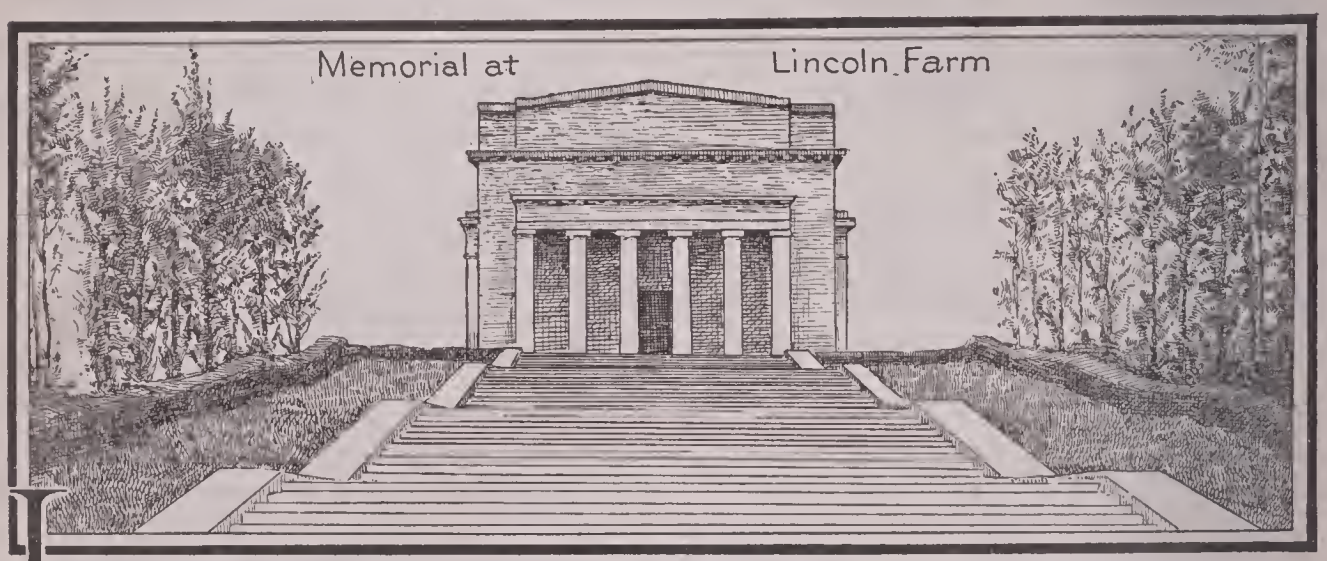
LINCOLN, *ling'kun,* one of the oldest and most interesting towns in England, capital of the county of Lincolnshire, 130 miles by rail northwest of London. It is situated on the banks of the River Witham, and is picturesquely built on the slopes of a hill which rises 200 feet above the river's banks. Besides the cathedral, which is described below, Lincoln has several interesting buildings, such as the remains of the castle built by William the Conqueror in the eleventh century, the building known as John of Gaunt's palace and stables, and several remains from the Roman period of occupation, which began in 55 B. C. Lincoln was an important trading center as early as the Roman era. It is to-day the junction point of six railroads and has extensive waterway communications, but it has lost its former commercial importance. It is the center of a large agricultural district and has im-



LINCOLN CATHEDRAL

portant cattle and horse fairs. Lincoln has large establishments for the manufacture of agricultural machinery and implements, as well as extensive iron foundries and flour mills.

Lincoln Cathedral. This is the principal building of the city, and towers over it majestically from the crown of the hill upon whose slopes the city is situated. It is the oldest purely Gothic work now in existence, for it was first consecrated in 1092, and is considered one of the finest and most beautiful cathedrals in England. Formerly there were three spires, all of wood or leader timber, rising above the three large square towers which adorn the structure, but the last of these was removed over a century ago. In the great central tower, which is 271 feet high, hangs the bell, called "Great Tom," weighing over five tons, while the two western towers, each 206 feet high, rise nobly above the elaborate screen on the west front. For many years after the Reformation it was not used, but in the nineteenth century extensive repairs were made, and it is now the center of an Episcopal see.



LINCOLN, *ling'kun,* ABRAHAM (1809-1865), the sixteenth President of the United States, one of the heroes of the American people. As the savior of the Union Lincoln stands in history by the side of George Washington, the Father of his Country. He was not merely a statesman, not merely a man who sat in a high place and planned mighty deeds; he was a man whose life seems a part of the national existence. By the gift of that life he preserved the Union, and he gave it ungrudgingly, without a thought of its worth. Victory and death were needed to give Lincoln his imperishable place in history.

His Ancestry. Abraham Lincoln's earliest ancestor in America was one Samuel Lincoln, a weaver, who emigrated from Norfolk, England, in 1637. Samuel Lincoln made his new home in Salem, Mass., but his descendants moved first to New Jersey, next to Pennsylvania, and then to Virginia. In Virginia the Lincolns became fairly prosperous, and in 1780 there is recorded the sale by Abraham Lincoln of 240 acres of land for "five thousand pounds current money of Virginia." After this sale the Lincolns, or Linkhorns, as they sometimes spelled the name, moved to Kentucky. There the danger from Indians was still so great that practically the entire population, about 30,000 people, lived in fifty-two stockades which had been constructed for defense. Abraham Lincoln had three sons, who worked in the clearing with him. One day in 1788 a bullet from an Indian's rifle killed him.

According to the custom and law of the time, the eldest son, Mordecai, inherited most of the father's land, and became a prosperous and respected farmer, besides being a good storyteller and a fierce Indian fighter. Thomas, the youngest son, was only ten years old when his father was killed. His widowed mother moved with him to a neighboring county, where Thomas became a carpenter and cabinetmaker. He was a good workman, but was somewhat shiftless. From time to time he was "taken with spasms of religion;" much of his life he belonged to no denomination, but sometimes he would join two or three in rapid succession. In June, 1806, this carpenter married Nancy Hanks, the niece of Joseph Hanks, in whose shop he had learned his trade. She was a sensitive, melancholy, frail girl, with but little education. A year or two after their marriage, Thomas and Nancy Lincoln moved to

a small farm in what was then Hardin County and is now La Rue County, Kentucky. Here, on February 12, 1809, was born a son, who was named Abraham, after his grandfather. This Abraham, who was born in a hut and who thus began life under the most inauspicious circumstances, became the sixteenth President of the United States.

ABRAHAM LINCOLN

"A blend of mirth and sadness, smiles and tears;
A quaint 'knight errant' of the pioneers;
A homely hero born of star and sod;
A peasant prince; a masterpiece of God."
—ANON.

His Boyhood. The boy began life in what was called a "camp." It was a shelter about fourteen feet square, without a floor, and was made of poles. When Abraham was four years old the family moved to another farm, fifteen miles distant, and in 1816, when he was seven, the wanderlust again seized them, and they moved this time into Indiana, to a new farm in Spencer County. So wild was the country through which the Lincolns passed on this migration that in many places the father had to cut a way through the forest. For a year, winter and summer, the family lived in a half-faced shed, entirely open on one side. In the meantime, Abraham and his father worked on a permanent dwelling, into which they all moved before it was half completed. After this effort Thomas Lincoln relaxed, and for nearly two years made no attempt to finish the house. There were no doors, windows or floor. For chairs there were three-legged stools. The beds were made of poles stuck between the logs in the corner of the cabin, the opposite end of the beds being supported by crotched sticks driven into the ground. Here, in this bare shelter, Nancy Lincoln died in 1818. Her husband made a coffin of green lumber, and taking his children and a few neighbors, himself laid her to rest in the grave. The story is told that nine-year-old Abraham was much disturbed by the lack of proper ceremony, and a few months later, when an itinerant clergyman came that way, the boy induced him to visit the grave and repeat over it the solemn burial rites.

The death of his wife drove Thomas Lincoln to move again, this time back to Kentucky. There he met and married Sarah Bush Johnson, a widow with three children. He had courted her years before, when she was still Sally Bush. The new Mrs. Lincoln was the most prosperous woman the Lincolns had ever known. She brought them furniture, cooking utensils and real bedding. She forced her lazy husband to put a floor and doors in the cabin, and for the first time in their lives Abraham and his sister had something which resembled a home. Mrs. Lincoln also encouraged her stepson in his eagerness to learn. Lincoln's schooling was of the slightest; he once estimated that his entire schooling put together would make about one year. He read the Bible, and his literary style throughout his life showed that he read it diligently and with understanding. But his favorite books were Aesop's *Fables*, *Robinson Crusoe*, *The Pilgrim's Progress* and Weems' *Life of Washington*. By the time he was fourteen he could read and write with ease. He would write with chalk on the cabin walls, or on a piece of

HIS BIRTHPLACE

As it now appears. It may be seen in the memorial building on the Lincoln Farm.

wood, which he could then whittle clean again. Paper was too precious for daily practice in writing; it was saved for copying extracts from borrowed books. Thus Lincoln managed to learn more than the average boy of the neighborhood, yet when he was elected to Congress and was asked to give the facts of his life for the Dictionary of Congress, he dismissed his early years with two words, "Education defective."

Even as a boy Lincoln won a reputation for witty and forceful speech. He read everything he could lay his hands on. Every wandering preacher was sure to interest one boy in his audience, and every session of the county court

ONE OF HIS EARLY BOYHOOD HOMES

numbered him among the listeners. His knowledge, his humor and his gift for telling stories made him a favorite. His personal appearance encouraged the laughter with which his talk was always met. Tall and "lanky"—he reached his full height, six feet four inches, at seventeen—with a care-free mass of hair—he was, in the words of a contemporary, "the ungodliest sight I ever saw." Naturally he became a satirist, and the man who felt the sting of his sharp retorts was likely to remember them for a long time. In 1831 young Lincoln received his first chance in life. John Hanks, a relative of his mother, engaged him to help take a boatload of provisions and merchandise to New Orleans. Lincoln and his two companions built the boat which carried them down the Mississippi.

Political Ambitions. Only a year later, in March, 1832, Lincoln felt strong enough to announce his candidacy for the Illinois legislature. In an address to the people of Sangamon County he explained his opinions and revealed considerable skill in writing. One of its paragraphs, because of his own limited schooling, is especially noteworthy:

> "Upon the subject of education, not presuming to dictate any plan or system respecting it, I can only say that I view it as the most important subject which we as a people can be engaged in. That every man may receive at least a moderate education, and thereby be enabled to read the histories of his own and other countries, by which he may duly appreciate the value of our free institutions, appears to be an object of vital importance. * *"

While the election was still far away, the Black Hawk War threatened Illinois. Lincoln enlisted at the call for volunteers, and was chosen captain of his company. It is said that the oath of enlistment was administered to Lincoln by Jefferson Davis. The volunteers were mustered out, without having seen any fighting, in May, when Lincoln at once reënlisted as a private. It is a strange coincidence that he was mustered in by Lieut. Robert Anderson, who was in command of Fort Sumter in the critical days of 1860 and 1861. Returning to New Salem in July, Lincoln threw all his energies into the election campaign. Though he was a Whig candidate in a normally Democratic district, he stood third among twelve candidates, and in his own precinct only thirteen votes out of 300 were cast against him.

Lincoln then faced the necessity of earning a living. In the previous year he had served as clerk, but it was because of reputation rather than business experience that he was able to buy a half interest in a general store in New Salem. Lincoln had no money, so he gave his notes in payment. The venture proved disastrous after an uncertain existence of a year, and it took Lincoln fifteen years to pay the debts thus created. In May, 1833, he was appointed postmaster at New Salem; it was not a burdensome position, for the mail came but once a week, on horseback. In after years he was in the habit of saying that he carried the post office in his hat. The position was far from lucrative, and Lincoln was obliged to split rails, and help at the mill, and do any possible work to add to his slender income. In 1834 he served for a time as deputy-surveyor of Sangamon County.

In the same year he was elected to the Illinois house of representatives, in which he sat until 1842. In 1836, when a candidate for reëlection, he made an interesting statement about the right of suffrage:

"I go for all sharing the privileges of the government who assist in sharing its burdens. Consequently I go for admitting all whites to the right of suffrage who pay taxes or bear arms (by no means excluding females)."

A year later Lincoln issued a public statement regarding his attitude toward slavery. This was a year of great agitation, the year in which the abolitionist Lovejoy was murdered at Alton, Ill. Lincoln put his opinions on record in a protest against certain resolutions passed by the Illinois legislature condemning the abolition movement. Lincoln said that he believed that "the institution of slavery is founded on both injustice and bad policy, but that the promulgation of abolition doctrines tends rather to increase than abate its evils." Moreover, he added his belief that Congress had "no power under the Constitution to interfere with the institution of slavery in the different states."

Lincoln, the Lawyer. While serving in the legislature he continued the study of law, and in 1837 was admitted to the bar. He removed to Springfield in 1839, when that city became the capital of Illinois, and there he formed a partnership with one of the leading lawyers, John T. Stuart. Stuart was active in politics, and left much of the detail of his practice to his new partner. In 1841 Lincoln became the junior partner of ex-Judge Stephen T. Logan, one of the best lawyers in the state. The partnership lasted only two years, being broken because both men sought nomination to the national House of Representatives. Lincoln was defeated, but was elected in 1846, the defeated candidate being Peter Cartwright (which see). During his single term he spoke against slavery and voted for the Wilmot Proviso. At the close of his term, in 1848, he was offered the governorship of the new territory of Oregon, but declined it, so it was said, because his wife refused to go to Oregon with him. He had married Mary Todd, on November 4, 1842.

Lincoln had strongly opposed the Mexican War, an attitude which he felt had practically ruined his political future. At the close of his term in Congress, therefore, he decided to practice law more actively. With an earnest and simple mind, he was strongest in cases in which his client had the fundamental right. He frequently dropped cases after he found that they could be won only on a technicality, and was even known to urge a friend, who was acting jointly with him, to return part of an excessive fee. These characteristics became generally known and added to his personal popularity; they also assured him the sympathetic attention of any judge or jury whom he happened to be addressing.

The Approaching Crisis. Lincoln's return to active political life was the result of the same changes which finally led to the War of Secession. Between 1848 and 1854, though nominally inactive, he was still the foremost of the

HOME IN SPRINGFIELD, ILL.

Illinois Whigs, and when the time came for Stephen A. Douglas to justify the Kansas-Nebraska Bill to the voters of Illinois, Lincoln was the logical man to oppose him. In October, 1854, he answered Douglas at the state fair, at Springfield, in a speech which was so effective that the Abolitionists attempted on the same day to commit him to their cause. A month later his district again sent him to the legislature, but he at once resigned lest there be some question about his eligibility for the United States Senate.

A few ballots in the legislature showed that Lincoln could not be elected, but his friends succeeded in electing Lyman Trumbull, who was a Democrat, but opposed to Douglas' policies. Lincoln was active in organizing the Republican party, and at the first national convention, in 1856, received 110 votes for Vice-President, a compliment to his reputation even before the great debates with Douglas made him a national figure. In 1858 the Republicans nominated him for Senator, to oppose Douglas, who was a candidate to succeed himself. In his speech accepting the nomination Lincoln used language which may have cost him that election, but which prepared the way for a greater prize. He said that—

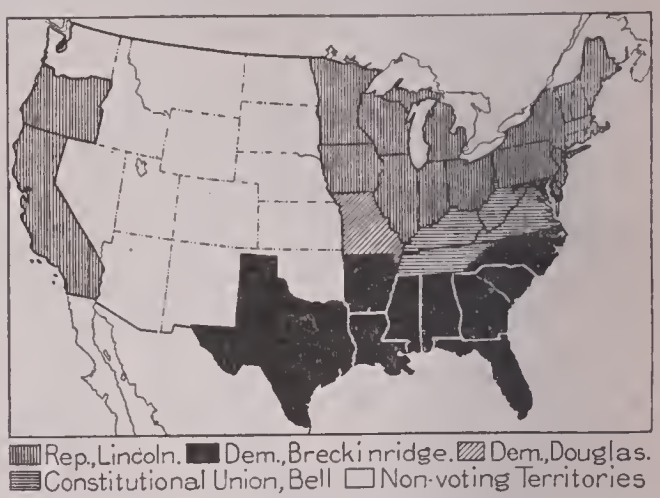
"A 'house divided against itself cannot stand.' I believe this government cannot endure permanently half slave and half free. I do not expect the Union to be dissolved. I do not expect the house to fall—but I do expect it will cease to be

divided. It will become all one thing or all the other. Either the opponents of slavery will arrest the further spread of it, and place it where the public mind shall rest in the belief that it is in the course of ultimate extinction; or its advocates will push it forward, till it shall become alike lawful in all the states, old as well as new— North as well as South."

The Debates with Douglas. After a few preliminary speeches Lincoln challenged Douglas to a series of seven joint debates. The first was held at Ottawa, Ill., on August 21, and the last at Alton, on October 15. Lincoln in debate could hit hard blows. His manner and his mind were earnest, and when his shrill voice trembled with conviction he won the confidence of his hearers in a way that the polished, suave Douglas never did. Horace Greeley, who openly preferred Douglas to Lincoln, said that Lincoln became the foremost *convincer* of his time. In the second debate, at Freeport, Douglas was hard pressed, and was driven to state that "slavery cannot exist a day or an hour anywhere unless it is supported by local police regulations." Douglas succeeded for the moment in reconciling the Dred Scott decision and his own doctrine of squatter sovereignty (which see), and won the Senatorship, but he lost the favor of the South. Douglas' victory had not the slightest effect on his opponent, except possibly to increase his ardor. In 1859 Lincoln made a number of speeches in the Central West, and early in 1860 was invited to speak in New York and other Eastern cities.

The Cooper Union Speech. The joint debates with Douglas had given Lincoln a national reputation. In the East there was great curiosity to see and hear the man who dared to oppose the "Little Giant." The Douglas debates contained so complete a statement of Republican doctrine that the more they were read the more highly was Lincoln regarded. On February 27, 1860, Lincoln spoke at Cooper Union, before a vast crowd. The speech was serious. It had none of the racy quality of a stump speech, and it lacked anecdotes and jests. Lincoln understood his opportunity, and confined himself to a serious presentation of the slavery problem. He especially denied Douglas' views that "our fathers, when they framed the government under which we live understood this question [slavery] just as well and even better than we do now," and by keen historical analysis tore away the supports for Douglas' statement that "the fathers made the country and intended that it should be part slave." Lincoln's words left a profound impression, and at the same time gave the East a more nearly adequate understanding of one of the greatest men in history.

Candidate for President. As early as 1858 there were occasional suggestions from Lincoln's friends that he should become a candidate for the Republican nomination in 1860. Not until a year later, however, did Lincoln



ELECTION RESULTS, 1860

make any open moves to this end. When the Republican convention met at Chicago, in May, 1860, the first choice of the delegates was William H. Seward. Seward, however, had made many opponents by his radical attitude toward slavery, and Lincoln received the support of Indiana and Pennsylvania, two important doubtful states. On the third ballot Lincoln was nominated. In the meantime the Democratic party had split into two wings, although the division did not become hopeless until after the nomination of Lincoln. The Democratic convention met at Charleston on May 3, but adjourned without making a choice. On May 6, John Bell of Tennessee and Edward Everett of Massachusetts were nominated by the Constitutional Union party (which see). The Democrats met again at Baltimore in June and nominated Douglas, but the Southern Democrats left the convention and later nominated John C. Breckinridge for President.

Thus there were four tickets in the field. The two Democratic candidates were men of long experience and sound reputation in national politics. Lincoln, on the other hand, in spite of the Douglas debates, the great speech at Cooper Union and his long leadership in Illinois politics, was not sufficiently tested to suit many of the leaders of his party. Charles Francis Adams, whom Lincoln appointed minister to Great Britain, said after Lincoln's death

that "in the history of our government, down to this hour, no experiment so rash has ever been made as that of elevating to the head of affairs a man with so little previous preparation for his task as Mr. Lincoln." And Wendell Phillips asked, "Who is this buckster in politics? Who is this country advocate?" Lincoln declined to make an active canvass, a course which was justified by the result. Lincoln and Douglas divided almost the entire vote of the North, Breckinridge and Bell almost the whole of the South. For the first time since the founding of the republic a President was elected without an electoral vote from a slave state. Lincoln had 180 electoral votes to 72 for Breckinridge, 39 for Bell and 12 for Douglas. The popular vote was 1,866,452 for Lincoln, 1,375,157 for Douglas, 847,953 for Breckinridge and 590,631 for Bell. Lincoln was nearly a million short of a majority.

The Administration of Lincoln

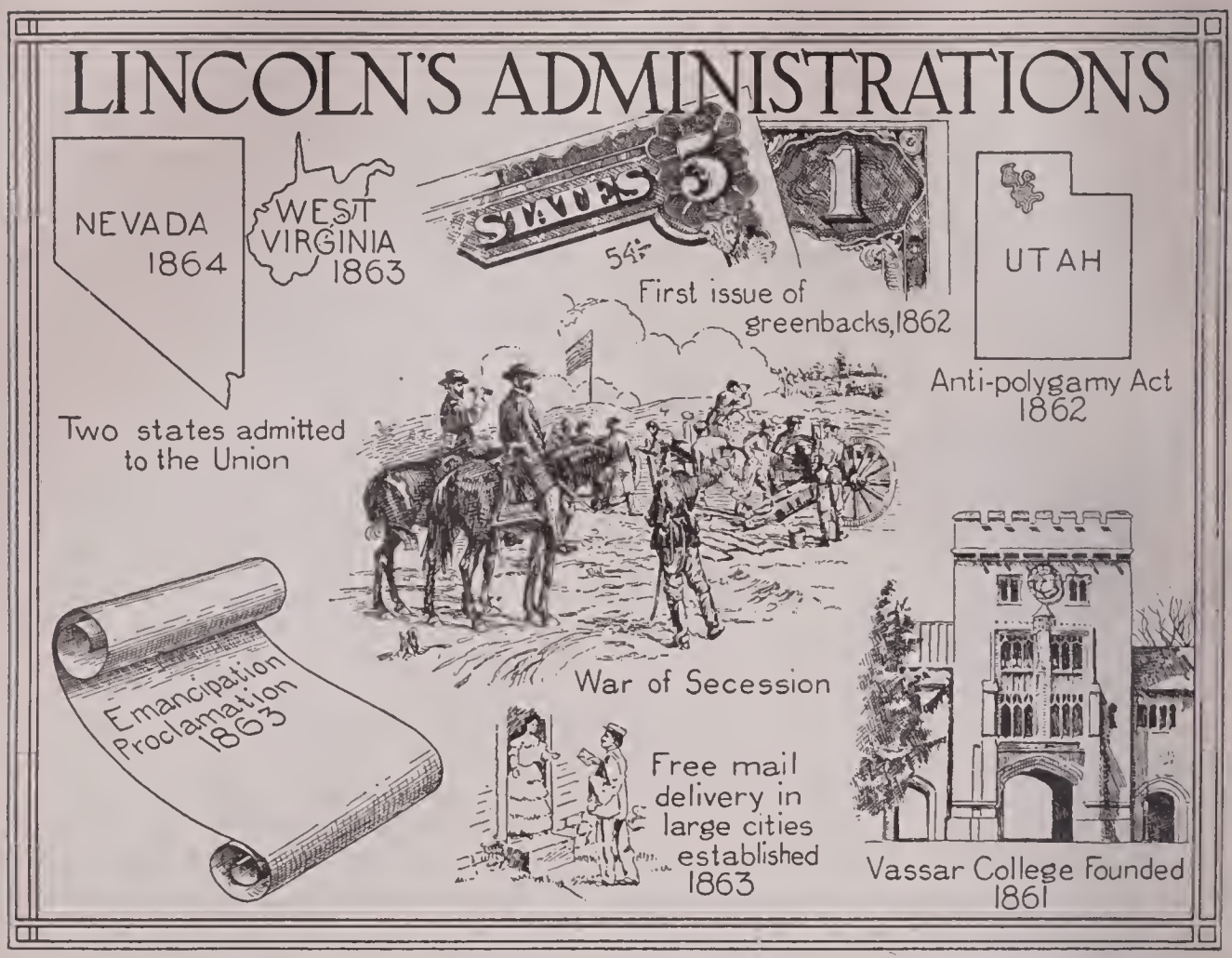
The Crisis. The events between Lincoln's election and his inauguration were the opening steps in the War of Secession (which see). In October South Carolina had sent circulars to the governors of the other Southern states, and in November, immediately after the election, herself seceded. It was the purpose of the Southern leaders to confront Lincoln, at his inauguration, with a confederacy in actual existence. On February 8, 1861, a constitution was adopted by delegates at Montgomery, Ala., and on the following day Jefferson Davis was elected President. On February 9 Lincoln started from Springfield, Ill., for Washington. He made frequent speeches on the way until he reached Harrisburg, Pa., where his plans were suddenly changed by evidence of a plot to assassinate him in Baltimore. The remainder of the trip Lincoln made hurriedly and in secret, reaching Washington on the morning of February 23. In spite of some threats and fears, the inauguration passed without disturbance. Seated near Lincoln on the platform were James Buchanan and Stephen A. Douglas, and the oath of office was administered by Chief Justice Taney, the author of the Dred Scott decision.

On the day following his inauguration Lincoln learned that Fort Sumter must soon fall if not reënforced. Notice was sent to General Beauregard, then commanding the Confederate forces before the fort, that provisions would be sent to the besieged, if possible. On April 11 Beauregard demanded the surrender of the fort, which was abandoned after a slight bombardment. The capture of Fort Sumter was the beginning of war, and filled both North and South with excitement. The military events of the next four years are given in detail elsewhere (see WAR OF SECESSION), and they will be mentioned here only incidentally.

The Lincoln Cabinet comprised chiefly defeated candidates for the Republican nomination for President. William H. Seward, as Secretary of State; Salmon R. Chase, Secretary of the Treasury; Simon Cameron, Secretary of War; and Edward Bates, Attorney-General, were its leading members. The variety of views held by these men added to the strain on Lincoln.

During the next four years the one thing uppermost in the minds of the people of the United States was war. The conduct of the government was subordinated to one purpose, the successful prosecution of the war. The Battle of Bull Run, on July 21, 1861, was the first great shock which Lincoln and the North had to endure. The Federal army not merely failed in its attack, but was defeated and hurled back to the Potomac. The North was in despair; the South, all confidence and joy. After the battle General McClellan was given command of the Army of the Potomac, and while McClellan drilled the army Lincoln kept up the fight for the conciliation of the border states and the solidarity of the North. In the late summer of 1861 Lincoln was troubled by the action of General Fremont, who crowned his exploits in Missouri by a proclamation confiscating property and liberating slaves. This action the President disapproved; he would permit no step toward emancipation, except for those who were doing military service in the Confederate armies.

Mason and Slidell Incident. Another episode which threatened serious trouble was the Mason and Slidell episode. Mason and Slidell were Confederate envoys to Great Britain and France, respectively. They ran the blockade at Charleston, went to Havana, and sailed from there on the British steamer *Trent*. Captain Wilkes, of the United States sloop *San Jacinto*, took the envoys off the *Trent*, to the intense joy of the North. But the British government demanded an apology and the release of the two men, and made preparations for war. As



Lincoln said on the day he heard of the seizure, the United States fought Great Britain in 1812 because the latter insisted on doing what Captain Wilkes did. Lincoln recognized that Captain Wilkes was in the wrong, and admitted the fact.

Emancipation of the Slaves. The indecisive military campaigns of 1861 and the summer of 1862 were trying days for Lincoln. The political outlook, too, was gloomy, for there was still a possibility of European interference on behalf of the Confederacy. Under these discouraging circumstances Lincoln was maturing a plan for the emancipation of negro slaves. In April, 1862, Congress purchased and freed all slaves in the District of Columbia, and two months later abolished slavery throughout the public domain. On September 22, 1862, after the Battle of Antietam, the President issued a preliminary proclamation of emancipation, warning the seceded states that unless they returned to the Union by January 1, 1863, all slaves would be declared free.

Lincoln was in favor of compensated emancipation; he believed that the slaveholders should be paid, but the border states were opposed to the plan. Lincoln knew, too, that emancipation might cost the support of the border states, might cause desertions from the army, and in any case could mean nothing unless it were followed by Federal victory. By July, 1862, however, Lincoln's opinion was fixed, and the proclamation was held to await a Federal victory. Antietam was indecisive, but it was technically a victory, and was sufficient excuse for the proclamation. On the afternoon of January 1, 1863, with a few joking remarks about the trembling of his hand, Lincoln signed the formal Emancipation Proclamation which declared that all slaves held in states then in rebellion should be free, and that the United States government should "maintain the freedom of such persons."

The Turning of the Tide. The year 1863, although in many ways dark for Lincoln, was marked by signs which foretold the end of the war. After McClellan failed to take advantage of his opportunities at Antietam, Burnside held command until the defeat at Fredericksburg. Then Hooker acted as chief and lost the Battle of Chancellorsville. This was perhaps the lowest point of the Federal fortunes. Soon after, Meade halted Lee at Gettysburg, where the three-days' battle ended the possi-

OUTLINE AND QUESTIONS ON ABRAHAM LINCOLN

Outline

I. Early Life

(1) Birth and parentage
(2) The family mode of life
(3) Lack of formal education

II. Becoming Well Known

(1) Candidacy for legislature of Illinois
(2) In Black Hawk War
(3) In Illinois house of representatives
(4) As a lawyer
(5) In the national House
(6) The Lincoln-Douglas debates
(7) Candidate for Presidency
  (a) Election of 1860
    1. Candidates
    2. Issues
    3. Result

III. His Administrations

(1) Outbreak of War of Secession
  (a) Fall of Fort Sumter
  (b) First call for volunteers
(2) Effect on country of Battle of Bull Run
(3) Foreign entanglements
  (a) The *Trent* affair
(4) Emancipation Proclamation
  (a) A war measure only
  (b) Applied to states in actual rebellion
(5) Disturbing domestic conditions
  (a) The Copperheads
  (b) Suspension of habeas corpus
  (c) Draft riots
  (d) National Banking Act
  (e) Desperate need in South
(6) The turning of the tide
  (a) Gettysburg and Vicksburg
    1. Gettysburg oration
(7) Election of 1864
  (a) Candidates
  (b) Issues
  (c) Result
    1. The great second inaugural address
(8) The surrender of Lee and close of the war
(9) Assassination of the President

IV. Character

(1) Claims to greatness
(2) Increasing fame

Questions

Why is Lincoln accounted with justice one of the greatest men who ever lived?

How do the boyhood and youth of Lincoln compare with those of the man who became Vice-President with him? With those of Garfield?

What did Lincoln's earliest home look like? What did that in which he lived when he was nine years old?

Who brought into his life the first really civilizing, refining influences?

Describe his appearance when he was seventeen years old.

What was his attitude toward education, and when was it expressed?

What military experience did he have?

During his young manhood, what was his attitude toward slavery?

If you had had a law case in Lincoln's day, why might you have wanted to entrust it to him?

Why did Lincoln make the latter part of his trip to Washington hurriedly and in secret?

Under what circumstances did Lincoln frankly admit that the South was wrong?

Why did he not issue the Emancipation Proclamation as soon as he had made up his mind that it should be done?

Who were the "Copperheads," and what part did they play in history?

What was the lowest point of the Federal fortunes? What marked the turning of the tide?

What does *sic semper tyrannis* mean, and when was it used?

bility of Confederate invasion of the North, and on July 4, 1863, Grant captured Vicksburg. On November 19, 1863, Lincoln spoke at the dedication of the national cemetery at Gettysburg. The orator of the day was Edward Everett, a polished speaker, whose address was a model of oratorical excellence. Lincoln had scrawled the notes for his three-minute speech on an envelope. He felt, like most of those who heard the speech, that his words added nothing to the occasion, but history has proved him wrong. The Gettysburg Address is one of the noblest gems in the English language, and its words will survive when even the names of Edward Everett and the others who participated in the ceremonies shall have been forgotten. (For text, see GETTYSBURG, BATTLE OF.)

After Gettysburg came another change of Federal commanders, for Meade failed to hammer Lee as Lincoln thought it should be done. The man who succeeded Meade was General U. S. Grant. When Grant took command, the Federal armies numbered about 975,000 men; the Confederates were about half that number. Grant's persistent pounding spelled doom for the weaker forces of the Confederacy, and on April 9, 1865, he received the surrender of General Lee's army at Appomattox Court House. It is interesting to note that in allowing the Confederate officers to keep their sidearms and horses Grant was exceeding Lincoln's instructions, but when Lincoln heard the terms of surrender he expressed great satisfaction.

Renomination and Reëlection. Early in 1864 Lincoln began to give less attention to military matters, and more to political affairs. The appointment of Grant, Sherman and Sheridan to the highest commands was followed by a change in Lincoln's attitude. Hitherto he had never given the Federal commanders the highest confidence, but henceforth he disclosed a justifiable trust in the judgment of his army leaders. The dress-parade commanders were all gone, and in their places were fighters. Lincoln's position towards Grant is set forth in a letter to him, dated April 30, 1864:

"Not expecting to see you again before the spring campaign opens, I wish to express in this way my entire satisfaction with what you have done up to this time, so far as I understand it. The particulars of your plans I neither know nor seek to know. You are vigilant and self-reliant, I wish not to obtrude any constraints or restraints upon you. While I am very anxious that any great disaster or capture of our men in great numbers shall be avoided, I know these points are less likely to escape your attention than they would mine. If there is anything wanting which is within my power to give, do not fail to let me know it."

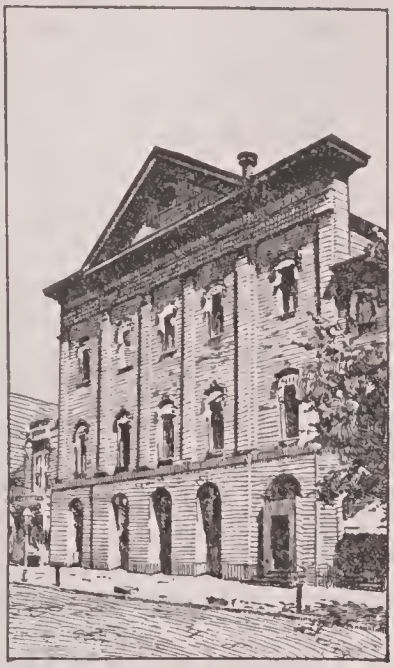
With confidence in his generals Lincoln gave much of his time to efforts for securing his renomination and reëlection. In his own party there was strong opposition from Salmon P. Chase and John C. Fremont, and skilful political maneuvering was required to eliminate these men. The Democrats nominated General McClellan on a platform declaring the President's war policy a failure and demanding peace. Before election day Farragut had entered Mobile Bay and Sherman had captured Atlanta. "Sherman and Farragut," said Seward, "have knocked the planks out of the Chicago platform"—the platform which declared the war a failure. To these exploits should be added Sheridan's picturesque victory in the Shenandoah campaign. Sheridan's message to Grant—"We have just sent them whirling through Winchester, and we are after them to-morrow"—thrilled the North and demolished what still remained of the Democratic platform. Lincoln's electoral vote was 212, against 21 for McClellan. The latter carried New Jersey, Delaware and Kentucky; Lincoln carried all the rest, including West Virginia, which had been admitted to the Union on June 19, 1863. The popular vote was much closer, being 2,330,552 for Lincoln to 1,835,985 for McClellan.

Victory and Death. Before the election Lincoln had labored in vain to secure from Congress a favorable vote on the Thirteenth Amendment, forever prohibiting slavery, but not until January, 1865, was the vote obtained. The adoption of this amendment removed all possibility of questioning the constitutionality of the Emancipation Proclamation. Early in February Lincoln suggested to his Cabinet that Congress be asked to appropriate $400,000,000 to compensate the owners of slaves in such of the Southern states as should have ceased resistance by April 1, but this proposal was unanimously disapproved by the Cabinet. It was a sign of Lincoln's conciliatory attitude toward the South, an attitude which found its noblest expression in the imperishable words of the second inaugural address. The closing sentence is one of the most frequently quoted sentences in the English language:

"With malice toward none, with charity for all, with firmness in the right as God gives us to see the right, let us strive on to finish the work we are in; to bind up the nation's wounds, to care for him who shall have borne the battle, and for his widow, and for his orphan—to do all which

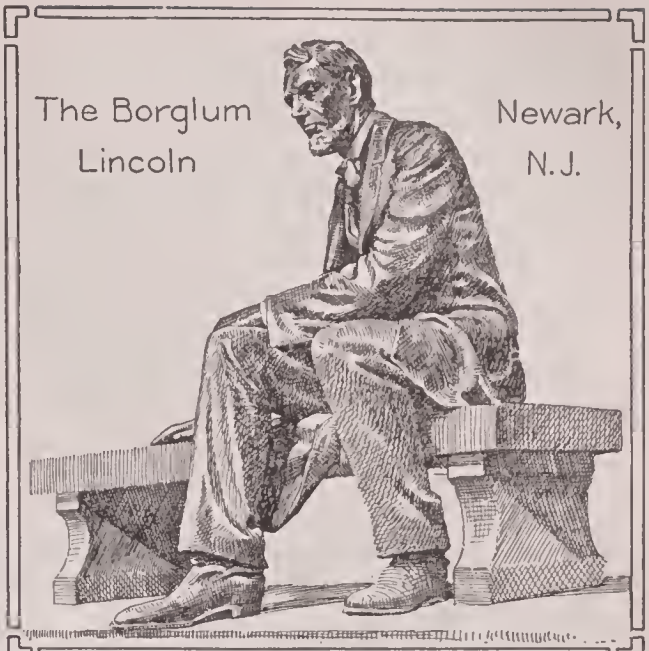
may achieve and cherish a just and lasting peace among ourselves, and with all nations."

General Lee surrendered on April 9, 1865. Five days later, on Good Friday, April 14, General Grant arrived in Washington, and attended a Cabinet meeting at which reconstruction was the chief subject under discussion. On the evening of that day President Lincoln attended a performance of *Our American Cousin* at Ford's Theater. A few minutes after ten o'clock a shot rang through the crowded house. John Wilkes Booth, a half-crazed actor, had shot the President through the head. Leaping to the stage from the President's box, Booth caught his spur in the folds of the American flag. He fell and broke his leg, but limped across the stage, while he brandished a dagger and cried, "Sic semper tyrannis" (thus ever to tyrants), the motto of Virginia (see BOOTH, subhead *John Wilkes Booth*). The bullet entered Lincoln's brain, and he did not regain consciousness. He was carried to a neighboring house, where he died at twenty-two minutes past seven on the morning of the next day, April 15, 1865.



FORD'S THEATER
Building in which President Lincoln was assassinated.

The immediate result of Lincoln's tragic death was a sudden cessation of the bitter criticism which he had borne for four years. The funeral was on the nineteenth. Behind the coffin, at the head of the line, marched a detachment of negro troops. During those sad days all business was suspended; never before had a nation so deeply mourned. The progress of the special funeral train from Washington to Springfield, Ill., where the body rests, was marked by endless lines of sorrowing people. Now poets, editors and orators sing his praises. This simple man, sprung from the soil, descendant of a poor, even shiftless stock, had risen to the highest place in the nation, and had wielded dictatorial power. The United States, never before in its history,



Lincoln's Birthday

SUGGESTIVE PROGRAMS

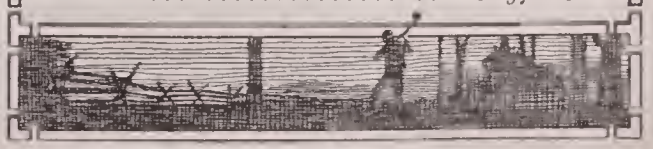
Let us have faith that right makes might; and in that faith let us to the end dare to do our duty as we understand it.
—*Lincoln*

I

Song, *Battle Hymn of the Republic*... .....*Howe*
Flag Salute
O Captain! My Captain.....*Whitman*
"Chalk Talk"—Drawing of cabin in which Lincoln was born, with story of his childhood
Lincoln .....*Longfellow*
Essay, *The Boyhood of Lincoln*
Lincoln, from the *Commemoration Ode* .....*Harriet Monroe*
Essay, *Lincoln's Rise to the Presidency*
Second Inaugural Address.....*Lincoln*
Essay, *The Years in the White House*
The Moral Warfare.....*Whittier*

II

Song, *Liberty's Banner*..... .....Music from Verdi's *Anvil Chorus*
Quotations about Lincoln
Patriot Sons.....*Samuel F. Smith*
The Hand of Lincoln.....*E. C. Stedman*
The Gettysburg Oration.....*Lincoln*
Lincoln, from the *Commemoration Ode* .....*Lowell*
Essay, *Lincoln's Kindness of Heart*
On the Life Mask of Abraham Lincoln .....*Richard W. Gilder*
Selections from *Abraham Lincoln*..... .....*R. H. Stoddard*
Quotations from Lincoln
Lincoln's Grave.....*Maurice Thompson*
Conclusion of *The Building of the Ship* ..... *Longfellow*



allowed any President as much power as Lincoln wielded. Yet he never lost his sense of proportion. Phillips Brooks said of him: "There are men as good as he, but they do bad things. There are men as intelligent as he, but they do foolish things. In him goodness and intelligence combined and made their best result of wisdom." W.F.Z.

Consult Baldwin's "Abraham Lincoln," in *Four Great Americans;* Morgan's *Abraham Lincoln, the Boy and the Man;* Creelman's *Why We Love Lincoln;* Craven's *Story of Lincoln, for Children;* Tarbell's *Life of Lincoln.*

LINCOLN, Robert Todd (1843-), the oldest son of Abraham Lincoln, and himself a noteworthy figure in American political and business life. He was born in Springfield, Ill., where his father was then practicing law. Being ambitious to follow the same profession, he entered Harvard Law School, after being graduated from Harvard University; but the War of Secession broke out almost immediately, and he at once volunteered. Under his father's good friend, General Grant, the young man served as captain until the war was over. He then resumed his law studies, was admitted to the bar in 1867 and practiced in Chicago until 1881. In that year he was called to Garfield's Cabinet as Secretary of War, in which post he continued under President Arthur; later he served as minister to England by appointment of President Harrison in 1889, returning home four years later. At the close of the Harrison administration in 1893 he withdrew from public life and became counsel for the Pullman Company. Four years later he succeeded to the presidency of that company, upon the death of George M. Pullman. This position he resigned in 1911, becoming chairman of the board of directors.

LINCOLN, Ill., an industrial city of Central Illinois and the county seat of Logan County, twenty-nine miles northeast of Springfield and 150 miles southwest of Chicago. It is on the Chicago & Alton and the Illinois Central railroads and on the Illinois Traction System. In 1910 the population was 10,892; in 1916 it was 11,838 (Federal estimate). Lincoln is the seat of Lincoln College, which since 1901 has been affiliated with James Millikin University (Presbyterian) at Decatur. The city has a Carnegie Library, the state school and colony for feeble-minded children, an Odd Fellows Orphans' Home, Deaconess' Home and Hospital and Saint Clara's Hospital. The industrial establishments of the city include coal mines, large greenhouses, flour mills, creameries and manufactories of electric automobile-signal horns, shoes, corn-cutting machinery, mattresses, horse collars, caskets and cigars.

Abraham Lincoln, for whom the town was named, helped to plat the settlement, which was done in 1835. The place was incorporated in 1854. The commission form of government was adopted in 1915. One of the most interesting features of the town is the old courthouse in which Lincoln practiced law.

LINCOLN, Neb., the capital and the second largest city of the state, ranking next to Omaha, and the county seat of Lancaster County. It is fifty-five miles southwest of Omaha, 200 miles northwest of Kansas City and 500 miles east and north of Denver, and is on the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Missouri Pacific, the Chicago & North Western and the Union Pacific railroads. Several interurban lines extend to suburbs. The population, including a considerable number of Scandinavians, Italians, Greeks and Poles, was 43,973 in 1910; it had increased to 46,515 in 1916 (Federal estimate). The area of the city is about eight square miles.

Lincoln is situated on rolling prairie land which slopes gradually north and west, and is drained by the Salt Creek, a tributary of the Platte River. The surrounding country is agricultural. Among the principal parks are Antelope, covering 121 acres, and Lincoln, five acres. A fine monument to Abraham Lincoln was made for the city by the sculptor Daniel C. French. Two miles southwest is Epworth League Park, where a Chautauqua is held annually. Near the city are the state fair grounds.

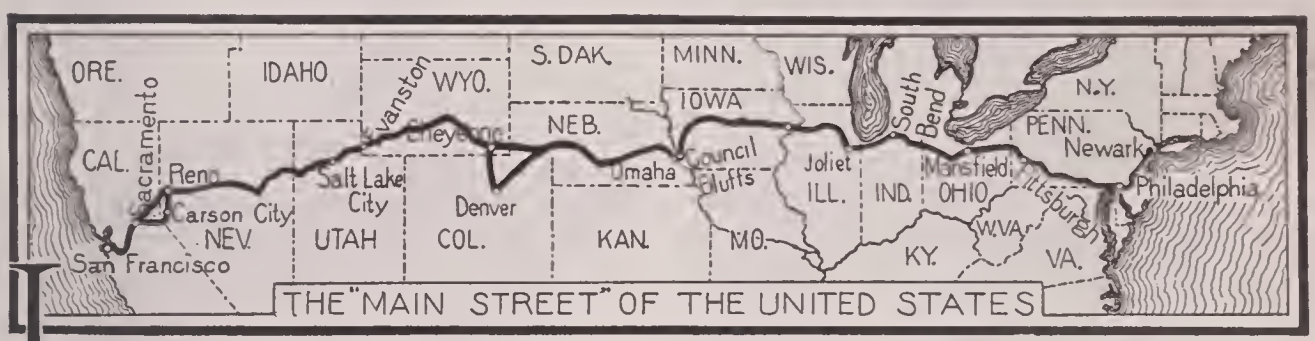
Institutions. Lincoln is the seat of the University of Nebraska (see Nebraska, University of), which is located in the heart of the city. Nebraska Wesleyan University and Conservatory of Music are at University Place, an adjoining suburb; Union College (Seventh Day Adventist) is at College View, Cotner University (Disciples of Christ) is at Bethany. Lincoln is well supplied with libraries,—the university, the state, the state historical and two city libraries. The state penitentiary and the state hospital for the insane are located here, and among a number of benevolent and charitable institutions are Saint Elizabeth's Hospital and the Home for the Friendless.

Public Buildings. Prominent buildings include the state capitol, constructed at a cost of

$500,000; a Federal building, county courthouse, Carnegie Library, the Scottish Rite Masonic Temple, Commercial Club Building, Y. M. C. A. and Y. W. C. A. buildings.

Industry. Lincoln is the trade and supply center for a large surrounding territory. There are more than one hundred wholesale houses, and the city stands high among places of its size in the distribution of fruit, live poultry, groceries and farm implements. The largest industrial establishments include the large Burlington shops (which employ 1,110 mechanics) at Havelock, a suburb east of the city; a creamery, said to be the largest in the world; grain elevators, a seed farm and manufactories of paint, corsets, gasoline engines, irrigation supplies, upholstered goods, mattresses, brooms and dusters, overalls and shirts, saddles and harness, sashes and doors.

History. Settlers were first attracted to this vicinity by the salt springs. The town of Lancaster was organized in 1862, when there were but few inhabitants, and in 1867, with a population of thirty, the place was chosen as the state capital and the name changed in honor of Abraham Lincoln. In 1913 the commission form of government was adopted. Lincoln is the home of William Jennings Bryan.



LINCOLN HIGHWAY, a road for vehicles, extending entirely across the northern part of the United States, its eastern terminus across the Hudson River from New York City, in New Jersey, its western at San Francisco. It is named in honor of Abraham Lincoln; its object is to provide a practically perfect highway across the continent and to encourage good road-building in all of the states of the American Union.

It has for many years been the boast of France that a person can walk along almost any road from one end of the republic to the other without wetting his feet. France has been densely populated for many hundred years; it is much smaller than the state of Texas, and is only twice as large as the entire state of Colorado. Road-building in a small area presents few difficulties such as attend like labor in a country so vast and so thinly settled as is a considerable part of the United States.

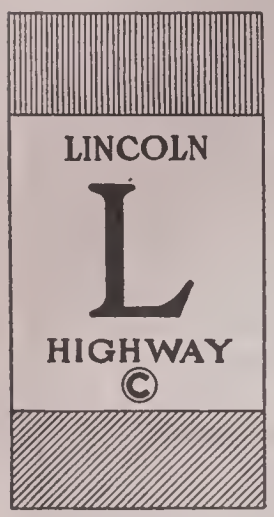
Most of the Eastern states of the Union possess remarkably good roads; their populations are dense, the people travel much, and money appropriations have been freely made for highway improvement. The West is helpless, so far as the building of hard-surfaced roads is concerned. To reach the Pacific coast one must pass through states where for miles one sees no human habitation. The state of Nevada has a population of less than one person to the square mile and an area more than half as large as that of France; it is manifestly impossible to expect the inhabitants of such a section, no matter what their desires may be, to bear the extremely-heavy expense of constructing even one hard-surfaced road through the state.

In 1912 a group of men headed by Carl H. Fisher of Indianapolis proposed that a national road should be built across the country and paid for by voluntary contributions and local appropriations. It was believed that if the good effects of one thoroughly-good highway could be made apparent it would hasten the day when America's two million miles of unimproved roads would cease to be more or less of a disgrace to the various communities.

An association was organized, with headquarters at Detroit, late in 1913. The shortest and most practicable route across the continent was selected, and the labor of securing funds was begun in all localities along the line. The response exceeded expectations. The President of the United States in touring the country in 1912 gave the project a strong unofficial endorsement when he said, "One reason I am in favor of good roads is because they wipe out sectionalism; they tend toward a national unity of thought and sentiment."

Personal contributions and local, state, county and city appropriations assured the suc-

cess of the enterprise. The Lincoln Highway, as marked for its entire length, is 3,331 miles long, and is the longest connecting roadway in the world. It has been marked for practically its entire length with conspicuous red, white and blue signs. Many towns and cities have renamed the local street through which this road passes, now calling it "Lincoln Highway."



THE GUIDE ALONG THE ROUTE

Some of the thirteen states traversed by the Lincoln Highway are already marked from end to end. The official marker, copyrighted, stands twenty-one inches high and consists of a strip of red three inches nigh at the top, a white band twenty-one inches wide and a strip of blue three inches below. On the white background in blue there is a large letter "L" and the words "Lincoln Highway" in smaller type. This marker is painted on telegraph poles, barns, fences or whatever is available, and can be seen readily by the tourist. There will be a marker every 200 feet in addition to those placed at railroad crossings and sharp corners on the highway.

From Jersey City the road extends almost straight southwest to Philadelphia, then west across Pennsylvania, Northern Ohio and Indiana, passes twenty-five miles south of Chicago, west through Northern Illinois and Central Iowa, with an abrupt turn to Council Bluffs, thence due west through Nebraska and Wyoming, with a triangular loop to Denver, then southwest through Northern Utah, west and south through Nevada, and thence to San Francisco (see map, in panel at the head of this article).

At the Panama-Pacific International Exposition in San Francisco in 1916 there was a remarkable statue of a Plains Indian on horseback, horse and rider wearied to the point of exhaustion. This statue, called "The End of the Trail," will be erected at the western terminus of the Highway, on the San Francisco Bay shore.

As expected, the publicity given the Lincoln Highway, and the enthusiasm with which the project was received throughout the entire route, has inspired many other large road-building projects. The most conspicuous of these is the Dixie Highway, originally designed to extend from Chicago to Southern Florida, but later extended into Northern Michigan. The South has been earnest in the development of this road. It is described in full under its own title in these volumes.

Possibly the next in importance among the long routes, either proposed or under construction, is the Jackson Highway, extending from Minneapolis through the states of Iowa, Missouri, Arkansas and Louisiana, with its southern terminus at New Orleans; a branch will reach Dallas, Texas. A dozen other projects, somewhat less ambitious but fully as important to the sections affected, may all be said to be the result of the original agitation in connection with the Lincoln Highway. E.D.F.

"THE END OF THE TRAIL"

LIND, JENNY (1820-1887), known in private life as MADAME OTTO GOLDSCHMIDT, was a famous soprano, "one of the finest pearls in the world's chaplet of song," in the words of Meyerbeer. Jenny Lind was born in Stockholm, Sweden; studied in Paris under Signor Garcia; subsequently became a member of the Royal Swedish Academy of Music in her native city, and in 1840 was appointed court-singer. Her first appearance as an opera singer was made as *Norma,* in which part she electrified her audience. In 1845 she sang before Queen Victoria of England, who was visiting at Bonn. The following year, when she sang in Vienna, her popularity increased. On the last evening of her engagement thousands of people thronged beside her carriage and escorted her home, and she was obliged to appear at her window thirty times to acknowledge the applause of the crowds. In 1847 she made her first London appearance, at Covent Garden, where she was received with enthusiasm. The

ON THE LINCOLN HIGHWAY.

At top: Left, a seven-mile stretch in Pennsylvania, at summit of the Alleghenies; right, a shady section in Iowa. At bottom: Left, an Illinois gravel road; right, in Northern Indiana.

ON THE LINCOLN HIGHWAY.

At top: Left, through the wonderland of Wyoming; right, in the desert in Nevada. At bottom: Left, passing Donner Lake, California; right, the half-way mark, in Nebraska.

queen would have showered valuable gifts upon her, but she accepted nothing but a bracelet, which she always treasured.

In 1850 she visited the United States under the management of P. T. Barnum, and toured the country for nearly two years. She sang in a hundred concerts, and created unprecedented enthusiasm wherever she went. She was paid $1,000 a night for 150 nights; friends of Barnum predicted his ruin because of such a contract, but his receipts were $700,000, and people fought for opportunity to secure choice seats—sometimes at auction prices. In February, 1852, in Boston, she was married to her accompanist, Mr. Otto Goldschmidt. When her husband became leader of the Bach choir in London Madame Goldschmidt sang frequently in oratorios and concerts. She made her last appearance at a concert for charity at Malvern in 1883.

LIN'DEN, the name given in Europe to a large, handsome forest tree more popularly known in America as *basswood.* It is described under that title in these books.

LINDSAY, *lin'zi,* the county town of Victoria County, Ontario, on the Grand Trunk and Canadian Pacific railways, sixty-nine miles northeast of Toronto. Lindsay is also on the Scugog River, which is navigable and provides steamer connection with the Trent Canal. The town has a large trade in lumber, grain and flour, and among other things manufactures doors, sashes and other lumber products, boots and shoes, agricultural implements and carriages. The county buildings are conspicuous, as are also the collegiate institute and a Roman Catholic convent. Population in 1911, 6,964; in 1916, about 7,500.

LINDSEY, Benjamin Barr (1869-), an American judge who has attracted widespread attention through his work intended to improve the relations between the law and youthful offenders. He is the originator of the leading features of juvenile courts (which see), and is an authority on methods of dealing with the delinquency of boys.

Judge Lindsey was born in Jackson, Tenn., where he attended the public schools. In Denver, Colo., while working in a real-estate office, he read law in his spare hours, and after making a name for himself in this profession, he was elected judge of the Denver juvenile court (1901). In that capacity he introduced the feature of putting boys on their honor, and also originated many other improvements in the handling of youthful transgressors.

For several two-year terms he was returned to the office, but his reëlection in 1913 was marked by a most bitter campaign. This was due to his denunciation of the system which extends privileges and monopolies to a few and denies common rights to the many (which he says is the cause of involuntary poverty). His courageous stand made him the object of violent attacks, but he succeeded in holding the confidence and respect of the public.

BENJAMIN B. LINDSEY

Judge Lindsey has conclusively proved the value of the probation system, and especially that of private hearings by a wise and sympathetic judge. He is the author of *Colorado Juvenile Court Law, Problems of the Children, The Beast and the Jungle, The Rule of Plutocracy in Colorado* and other writings.

In 1915 he was a member of the party which embarked on a futile mission, under the direction of Henry Ford (which see), to bring peace to the warring nations of Europe. Judge Lindsey's reputation is so firmly established in Europe that he was a conspicuous figure in every European city he visited.

Consult Steffins's *Upbuilders.*

LINE, a continuous extension, purely imaginary, of length without breadth or thickness. It may be described as the track of a moving point. Lines may be parallel, oblique, perpendicular, or tangential; they may be straight, curved, broken or mixed. A broken line is a number of straight lines, a mixed line is a number of straight and curved lines. See Geometry.

LIN'EN, a superior kind of cloth woven from the fibers of flax, which provides mankind with a wonderful variety of strong and useful fabrics. In daily use in the home are linen towels, bedding, tablecloths and napkins; linen dresses, shirts, collars, cuffs and handkerchiefs are familiar articles of apparel; and there are so many other ways in which the cloth is used we may say with truth that we have it with us all day long and throughout our lives.

Linen is famed for its durability. Specimens still well preserved are occasionally found in Egyptian mummy cases over 4,000 years old. Both the Egyptian and Jewish priests wore linen garments at their religious ceremonies, and the use and manufacture of the cloth passed from Egypt to Greece at a very early date. Greek men were wearing linen tunics when Homer composed the *Iliad* and the *Odyssey*. The Romans, true to their habit of borrowing whatever seemed worth while, acquired from their Greek neighbors the use of linen cloth, though it was not until the later years of the republic that its use became general. The fabric was also employed as a writing material, as evidenced by the Roman *libri lintei*, or "linen books." In medieval times linen clothing was quite generally worn throughout continental Europe, while the art of linen weaving was practiced in Great Britain as early as the Anglo-Saxon period, the fifth or sixth century of the Christian Era.

Manufacture. At the present time the production of linen takes high rank among the textile industries, both in point of extent and in output. The modern manufacture of the fabric dates from 1787, when two English inventors, John Kendrew and Thomas Porthouse, secured a patent for a "mill or machine upon new principles for spinning yarn from hemp, tow, flax or wool." From this invention was developed the perfect system of machinery which equips the modern spinning mill.

The preliminary process of preparing the flax for the mill is as interesting as it is important. The seed capsules must be removed, and the separate fibers must be combed out, untangled and placed in smooth, parallel rows. When freed from all impurities the flax is of snowy whiteness, lustrous and silky. The flax threads are spun into yarn, which in turn is handed over to the weaver to make into cloth, processes which are described in the articles SPINNING and WEAVING.

The introduction of modern machinery was the death blow to the fireside manufacture of linen, and the old-fashioned spinning wheel, once a familiar furnishing of peasant cottages and the colonial homes of the early American settlers, is to-day but an interesting relic! But how much it has been a part of the life of the people for centuries past may be judged from the prominent place it has in painting, song and story. From the Greek Fates (see FATES) spinning the thread of human destiny down to George Eliot's hermit weaver, Silas Marner, literature is rich in allusions to this symbol of human skill and thrift.

Fabrics. Linen fabrics show in a wide diversity, both in kind and in quality, ranging from the heavy sail cloth that equips the masts of a sailing vessel to the lustrous damask that beautifies the luncheon table. The heaviest manufactures include sail cloths, canvas, tarpaulin, sacking and carpeting, made principally in the Scottish towns of Dundee, Arbroath, Forfar, Kirkcaldy and Aberdeen, and in Barnsley, England. Medium weight linens find very general use, serving as tent covers, toweling, men's outer garments, linings, upholstery work, etc., and appearing for the trade as duck, huckaback, crash, tick, dowlas, low sheetings and low brown linens. Plain bleached linens are used chiefly for shirts, collars and bed sheets. Under the head of twilled linens are included dimity for household use and damask for table linen. Cambrics, lawns and handkerchiefs are included in the fine linens.

The linen industry in England is centered at Barnsley and Leeds, one of the factories in the latter town having one room which covers two acres. The finest linen manufactures of Great Britain are chiefly in Belfast and other towns in the north of Ireland. France, Belgium and Holland are renowned everywhere for their superior linens, and France is without a rival in the manufacture of lawn and cambric. In the United States the production of linen fabrics until 1914 was practically confined to the making of thread, twine and toweling, but the manufacture of finer linens received a great impetus when the War of the Nations broke over Europe and closed the markets.

Special Characteristics. Because of the delicate structure, durability and length of the flax fiber, linen fabrics are in several respects superior to cotton. Linen cloth is smoother and more lustrous, it soils less easily, and, being less spongy than cotton cloth, it does not absorb and retain moisture so readily. Indeed, white linen is generally associated with cleanliness and purity, an idea occurring frequently in Scripture. A typical instance is found in *Revelation* XV, 6, which speaks of the "seven angels clothed in pure and white linen." No other fabric leaves the hands of the laundress with quite the same spotlessness, gloss and smoothness, and the thread spun from the flax, firm and strong in spite of its delicacy, is used to make the rarest and finest lace.

It should be noted that many fabrics now on the market as linen are not pure linen; manu-

facturing ingenuity has made it possible to mix cheaper material with flax and produce a product which only the expert can detect as inferior. Hemp is the usual substitute. S.L.A.

Consult Gibbs's *Household Textiles;* Moore's *Linen.*

Related Subjects. The reader is referred to the following articles in these volumes:

Adulteration in Foodstuffs and Clothing	Dimity
Cambric	Flax
Damask	Hemp
	Lace

LING, Pehr Henrik (1776-1839), a Swedish poet, remembered not so much for his relation to literature as because he invented the so-called Swedish system of gymnastics. He traveled in his youth through France and Germany, and taught fencing, first at the University of Lund and later at a military school in Karlberg. Like Jahn in Germany, he tried to stir up love of country in the young men by his writings, and at the same time he trained their bodies at his gymnastic institute in Stockholm. His system of exercise for the development of the different parts of the body has been very widely adopted, and has formed the basis for many subsequent gymnastic methods.

LINNAEA, *li nc'a,* or **TWINFLOWER,** a delicately-beautiful little wild flower, found in cool, mossy northern woods. Its creeping stems trail through woods and on mountains of North America from Labrador as far south as Maryland, and in the northern countries of Europe and Asia. Here and there slender stalks rise from the creeping stems, each bearing several pairs of round, evergreen leaves and two beautiful, drooping, bell-shaped flowers of pink or rose-tinged white. These small, shy, perfume-laden twinflowers were favorites of the eminent Swedish naturalist, Linnaeus, and were named for him. As Emerson expresses it, they are a "monument of the man of flowers."

LINNE, *lin'nay,* Karl von, better known as Linnaeus, *li ne'us,* (1707-1778), one of the world's greatest naturalists, was born at Rashult, Sweden. Because he was the first naturalist to arrange the plants of earth according to a scientific classification, he is sometimes called the "father of modern botany." He began to write his great books on plant life in 1729; the first was a small one on the sex of plants. The following year he began his lectures and revels in the wonders of plants and flowers. He then wrote his celebrated *Systema Naturae.* He went to Amsterdam, Holland, to live with the famous Professor Boerhaave, and published his *Fundamenta Botanica* while there. A wealthy banker invited him to visit him in his magnificent garden at Hartecamp, where for a period he worked and lived like a prince, and wrote his *Flora Lapponica,* the result of a trip through Lapland.

In 1740 Rudbeck died, and Linnaeus succeeded him as professor of natural history at the University of Upsala. In 1750 he published the *Philosophia Botanica* and three years later *Species Plantarum.* His published works number over 180. To him science is indebted for the introduction of a new system of naming plants, known as the *binomial* (two-name) *method.* He placed the specific name of the plant in the margin, while the name of the genus stood at the head of the description. Though this arrangement is not followed today, it laid the foundations for present systems of classification. He also originated the method of classifying plants according to the number of stamens and pistils. The lowly, fragrant linnaea was named after Linnaeus.

LINNET, *lin'et,* a small finch, so named because it feeds on linseed, or flax, and hemp. In summer the male is a chestnut brown in color, with forehead, throat and breast of crimson. The plumage varies greatly in color with the season, causing the same bird to be known at different times by different names, as *gray linnet, red linnet,* etc. It has a sweet song and is easily tamed, making it a favorite cage-bird. The North American linnet is called the *redpoll.* It nests in the extreme north and in winter migrates as far south as Virginia and Illinois. One species is very common in California. The linnet builds its nest of dry grass and moss in low trees, bushes or tufts of grass; the eggs are four to six in number, and are white, tinged with green or blue and spotted with reddish brown.

LINOLEUM, *li no'le um,* a preparation of linseed oil which is hardened by falling in the form of a spray through a current of air. By this means it becomes an elastic and tough mass. Chloride of sulphur was first used as a hardening agent, but it was discovered that the combination with oxygen secured the same effect. It is used as a substitute for India rubber when rolled into sheets, and when vulcanized, or hardened by heat, it may be polished like wood for handles of knives or for moldings. When dissolved it is used as a varnish for waterproof fabrics; as a paint it may be used on both iron and wood, and as a cement it is as adhesive as glue.

A floor covering is made with linoleum as a base; it is more durable than oil cloth, which was once largely used. It is made by mixing the linoleum cement with ground cork, rosin and kauri gum, and, if a plain linoleum is desired, mineral coloring is added. This mixture is spread on burlap and passed through rollers to give it a smooth surface and uniform thickness. The inlaid, or figured, linoleum is made by stamping the pattern upon the surface, or making the design with cements of different colors.

LINOTYPE, *li'no tipe,* or *lin'o tipe,* a machine for setting type, so named because it casts a solid bar of raised letters the length of a desired line. Although complicated in design, the machine is simple in use and enables one printer to do the work of about eight in setting type by hand.

The operator sits before a keyboard similar to that of a typewriter, although much larger. He presses the key corresponding to that of the desired letter, and a brass mold, or *matrix,* having the letter impressed on its edge is released and travels down an inclined tube to a moving belt by which it is carried to its proper place in the line. The spaces between the words are formed by duplex wedges dropped into place in the same manner by pressing a key.

When the operator has set all the characters the line will hold, it is transferred automatically to the casting apparatus. Here the line is properly spaced, or "justified." The molds are then filled with melted type metal and a solid line of type is cast, which is carried, also automatically, to its proper position in the stick. The matrices are then returned by a lever to the case, being guided to their proper places by elevations and depressions on the back. The operator is thus relieved of the task of placing the type in the stick and distributing the matrices, and is able to attain great speed. The average speed is about 3,500 "ems" an hour, but a rapid operator may set 5,000 ems, and over; about 2,700 ems are contained in one page of this book.

The linotype machine was invented by Mr. Ottmar Mergenthaler, of Baltimore, who completed it in 1884, after twenty years of experimentation. Its success has been enormous, and no other type-setting machine is so widely used in the newspaper offices and other printing establishments of the world. It has now been developed to such a point of excellence that it is capable of the most intricate work. The cost of a machine, with attachments for electric power, is about $3,000.

LIN'SEED OIL, which is pressed from the seed of the flax plant, is the only oil successfully used in mixing paints. It is adapted to this use because it has the property of absorbing oxygen from the air and of drying quickly when spread in thin coats. The tough skin formed does not break or chip, and it withstands the weather. No substitute has ever been found, and no adulterant has proved successful. It is prepared in two ways—by hot press and by cold press. The latter gives a better grade of oil, but not in so great quantity. In the hot-press method, the seed is ground, boiled in water and pressed. The oil derived by the hot-press method is dark and has an unpleasant odor, but that defect has been remedied by chemical processes. It is also much cheaper. Linseed oil was known in very ancient times, but its peculiar properties as a drying oil were not made use of until the twelfth century. The production of linseed oil is from eighteen to twenty-seven per cent of the weight of the seed, depending upon the quality of the seed and the method of extracting the oil. The average yield is about sixty-six gallons to the ton. Under normal conditions linseed oil costs from sixty-five to seventy cents a gallon. See Flax; Paint; Varnish.

LIN'TON, William James (1812-1897), an English wood-engraver and writer whose book illustrations won for him an enviable reputation in his own day—a reputation which critics of later times have confirmed. He was also known as a radical republican, and published various periodicals in the interest of political reform. The last thirty years of his life he spent in the United States.

LINZ, *lintz,* a city of Austria, capital of the duchy and crownland of Upper Austria. It is an old city; its name appears in manuscripts as early as 800, and it is believed to have existed in Roman times. Some of its old buildings are interesting and picturesque, but for the most part Linz is a modern city, with attractive suburbs, flourishing manufactures and a thriving commerce. Much of its trade is with Vienna, between which city and Linz boats ply daily. For Linz is on the Danube, and from its wharves are sent out not only its own manufactured articles, such as machinery, tobacco, woolen goods and leather, but products of the tributary region, which are brought in by the railroads which make Linz their center. Its population in 1910 was 67,817.

LION, *li'un,* one of the strongest and most ferocious of wild creatures, known as the "king of beasts" and the "lord of the jungle." With respect to its appearance the lion well deserves these titles, for the powerful frame, large head and abundant growth of mane on the male give it a truly regal bearing, while its ferocity and appalling roar have made it the terror of the numerous animals on which it preys. It is the most famous member of the cat family—the cousin of the amiable "tabby" of the fireside and of the savage tiger, puma, lynx and leopard. Of this group the lion and the tiger are the largest members, and of these two the tiger is the fiercer.

Those of the "jungle lords" which attain the greatest size are three feet high, nine and a half feet long, measuring from nose to tip of tail, and weigh almost 500 pounds; the majority are perhaps two-thirds as large. The tail, which is one-half as long as the body, ends in a hairy tuft, which, with the mane, is the distinguishing physical characteristic of this member of the cat family. Only the male has a mane, the growth of which begins when the animal is three years old. A lion is full-grown at six or seven years, and lives from thirty to forty years. Pale tawny is the characteristic color of the coat, though some specimens are reddish, and occasionally a lion is black. The mane is usually darker than the coat and may have blackish patches. Besides being a mark of sex it serves as a protecting shield in the fierce combats for which the "king of beasts" is celebrated. Young kittens have black spots on their fur, but these disappear within a few months after birth.

Ages ago lions were found in great numbers in Europe, Asia and Africa, but they have been steadily driven back into the wild places by the advance of civilization, and now they are extinct in Europe, Asia Minor, Arabia and Egypt, and have almost disappeared from India. In Asia they are still found in the swampy lowlands along the Tigris and Euphrates rivers and in certain valleys east of the Persian Gulf; the African lion roams the southern parts of the Sahara Desert and the dense swamps of the tributaries of the Upper Nile, and is also found in the Kalihari Desert, in Abyssinia and in Mashonaland. The puma (which see) is sometimes called the American lion.

The Lion of the Wilds. The instinct of the lion to choose its lair in a secluded place is suggested in the following lines by the Scottish poet Thomas Pringle:

> Wouldst thou view the lion's den?
> Search afar from haunts of men;—
> Where the reed-encircled rill,
> Oozes from the rocky hill,
> By its verdure far descried
> 'Mid the desert brown and wide.

In dense thickets or patches of reeds, among rocks hidden by thickly-growing brushwood or in thorn-protected caverns, the lion lies sleeping through the day, and there are born in the spring season the baby lions. They are usually three in number and, unlike the kittens of the domestic cat, come into the world with their eyes open. Both parents are devoted to their offspring, and the male helps take care of his growing family until the young whelps are well grown.

It is chiefly at night that the lions hunt their prey. Antelopes, zebras and wild asses are much sought by them, but in those regions where wild game is being exterminated by the white man, they attack domestic cattle, goats, pigs, ponies and camels. Their powerful forelegs, nineteen inches around, and their great feet, armed with sharp, horny claws, constitute a terrible weapon whose striking power has been likened to that of a steam-hammer. Sometimes they kill their

victim with a single blow, but if not, the huge paw may grasp the nose of the animal and jerk back its head so as to break the neck, or the cruel teeth may fasten themselves on the blood vessels in the throat. When several lions take part in a slaughter the leader usually consumes a "lion's share of the feast," while the others help themselves to what may remain.

The lion is generally supposed to be a fearless creature, possessing those qualities one expects to find in a king of the animal world. Yet, true to its catlike instincts, it does not hesitate to wait in ambush for its prey and to steal upon it unawares. Varying stories are told of its bravery and of its cowardice, of its scorn of all but freshly-killed food, and of its greed. It is undoubtedly true, however, that, when driven to bay, it will battle with man and beast with the utmost daring and ferocity, and the hunter who confronts an aroused lion should fight it rather than attempt to flee.

Hunting the King of Beasts. The excitement afforded by lion-hunting is known to readers of "big game" literature. Colonel Roosevelt in *African Game Trails* says that in his opinion the lion is the most dangerous opponent of the hunter under ordinary conditions. The most common method of hunting the animal is to drive it from its lair and then to fight it in the open. A charging lion must be fired upon repeatedly and accurately so long as it seems able to advance, for the hunter who comes in contact with the animal's teeth and claws is almost certain to lose his life. Repeating rifles are used by modern sportsmen, and the hunting takes place on foot and not on horses or elephants. Tracking the lion in the jungle or waiting for it near a water hole, methods which call for fighting at close quarters, are practiced by some hunters, but they are considered dangerous and even foolhardy.

The American sportsman, Paul J. Rainey, who engaged in a notable lion hunt in Africa in 1911, made use of a number of tracking and fighting dogs with remarkable success. The former were trained to pursue the trail of a lion and bring it to bay, and the latter to worry it until the hunters came upon the scene. Rainey was accompanied by a squad of camera men, and the expedition was in due time presented to the public on the moving-picture screen. The educational value of these pictures was apparent to all who viewed them, for the actual life of the lion in the wilds was brought vividly before the spectator. It is not an easy matter to appreciate the difficulties attending such an undertaking, and it was only through the utmost attention to detail and unwearying patience that results were accomplished.

In Captivity. The lordly lion pacing restlessly up and down its cage is a source of unfailing interest to the visitor at the "zoo" or circus menagerie. "Has this noble creature visions of a home in a far-off desert or jungle?"

LIONS, MALE AND FEMALE

thinks the fascinated bystander. As a matter of fact, lions breed so readily in captivity it is probable that the majority of those now in zoölogical gardens never saw the native haunts of their ancestors. Life in the "zoo" cage seems not to diminish their natural ferocity nor to impair their physical superiority. They are fed on raw beef, and the wooden floors of their great wire cages are scrubbed and disinfected daily. The kittens, like their domestic cousins, are playful and affectionate.

Lions have sufficient intelligence to learn a number of interesting tricks, but it is usually the element of danger that appeals most to the spectators at a performance of trained lions. They are never fully to be trusted, even the most docile, and terrible injuries are sometimes inflicted by infuriated animals on trainers or their assistants.

In Story, Art and History. No other of the wild animals appears so often in story, art and history as the lion. The familiar story of *Androcles and the Lion* was a favorite among the ancient Romans. Androcles was a slave who ran away from a cruel master, hid himself in the den of a lion, and while there extracted a thorn from the foot of the beast that occupied this place of refuge. Years afterwards Androcles was commanded to go into the arena at Rome to fight a ferocious lion. The animal, instead of leaping upon him, fondled him like a pet dog, and when the spectators asked him

the meaning of this, he told them that it was the same beast he had once befriended. Slave and lion were then allowed to leave the arena and were afterwards exhibited in the streets of the city. One of Bernard Shaw's wittiest plays is a burlesque of this story.

In Biblical narrative there are numerous stories about lions or allusions to them. The best-known story is that of Daniel, the Hebrew captive at Babylon who was thrown into a den of lions because he persisted in praying three times a day to his God (see *Daniel* VI). In *I Peter* V, 8, Satan is likened to a roaring lion which goes about "seeking whom he may devour." The wicked, according to *Psalms* X, 9, lie in wait secretly "as a lion in his den."

From the days of the ancients the lion has had an important place in art and heraldry. It has appeared in sculpture and painting, and on medals and flags. To-day it is the emblem of Great Britain, and the lion rampant may be seen on the upper righthand quarter of the royal standard, the supreme flag of the British navy. Imposing sculptured lions guard the celebrated Nelson column in Trafalgar Square, London.

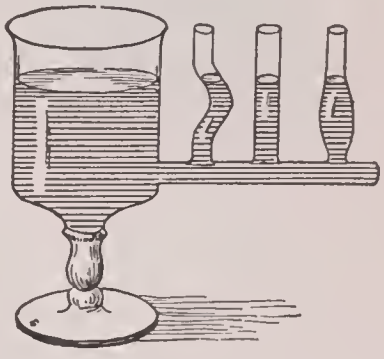
The lordly bearing of the lion is reflected in many familiar expressions. Richard I of England was called the "Lion-hearted" because of his heroic nature, and we speak of *lionizing* a man when we bestow popular honors upon him. The old story from *Aesop's Fables,* about the lion that hunted with the fox and wolf and claimed three-thirds of the game, has given rise to the expression "the lion's share." V.L.K.

For illustration of various members of the cat family, see article CAT, page 1220. Consult Herbert's *The Life Story of a Lion;* Carter's *Lion and Tiger Stories;* Patterson's *The Man-Eaters of Tsavo.*

LIPPI, *le'pe,* FILIPPO (1412-1469), commonly known as LIPPO LIPPI, an artist-monk, considered the first representative of the Florentine school of painters. His Madonna paintings are among the treasures of many famous collections. Fra Lippi loved gayety so much more than work that it was necessary for his patrons to lock him in a room while he was painting. But locks and keys did not avail, for 'tis said he tore his bed sheets to strips and let himself down from the window by them. However this might be, his works are noted for their warm, transparent color and expression of human sympathy. His greatest works extant are the frescoes in the Cathedral of Prado, representing scenes from the lives of John the Baptist and Saint Stephen. At the time of his death he was at work on a series of incidents from the life of the Virgin in the cathedral apse at Spoleto.

His son, FILIPPINO LIPPI (1460-1504), inherited his father's skill, and his art shows the influence of his father and that of Botticelli. Among his famous frescoes are scenes from the lives of Saint Peter and Saint Paul, in the Brancacci chapel at Florence. His finest easel-paintings are *The Virgin and Saints* in the Uffizi at Florence; *The Adoration of the Magi,* and *The Vision of Saint Francis.*

LIQUID, *lik'wid,* that state of matter in which its particles are not fixed with regard to other particles, but are free to slip or flow over each other under very slight impulse; at the same time a liquid substance, unlike a gas, possesses definite volume, almost incompressible. Unlike a solid, a liquid will fill every crevice of the containing vessel, and if there are several arms of different shapes, it will rise to the same level in all of them (see illustration). The free surface of a liquid has a tension due to molecular action, which acts like a thin skin. A needle will rest upon it without sinking, and it will support oil. It is surface tension, also, that makes water form into spherical drops in the air.



The figure shows that a liquid has no shape of its own but assumes the shape of any vessel into which it is placed.

LIQUID AIR is air reduced to a liquid state by compressing it at a temperature of 220° below zero F. under a pressure of 585 pounds to the square inch. It is of little use except to scientists, though for a time believed one of the most valuable discoveries of modern times. Its main importance to commerce is in the manufacture of large quantities of nitrogen (for ammonia, etc.) and oxygen. But it does so many wonderful things in the laboratory that it may yet become useful elsewhere. It is so cold that when placed on ice it will boil. If enclosed and heated it becomes a powerful explosive. Charcoal cooled by it absorbs gases very readily and can produce an exceedingly high vacuum. It increases the power of magnets, but lessens the action of chemicals, re-

duces the photographic power of Röentgen rays to seventeen per cent of the normal, and lowers the resistance of metals to electricity. Copper, ordinarily a poorer conductor of electricity than silver, it makes a better conductor. Liquid air itself is a non-conductor.

Liquid air was first made by Wroblewski of Cracow, in Austrian Poland, in 1883. Previous to that date no one had succeeded in producing a sufficiently low temperature to accomplish the feat.

LIQUID FIRE, introduced into the War of the Nations by the Germans, is a modern successor to Greek fire (which is described in these volumes under its own title). The liquid in its composition was frequently a mixture of gasoline and pitch or other coal-tar oil. It was shot from an apparatus known as a *Flammenwerfer,* or flame-thrower, for which a number of patents had been granted several years before the war. In the Flammenwerfer were two barrels. From the large lower one the main stream of the combustible liquid was propelled. From the upper barrel came a smaller stream which was automatically ignited as it reached the air, forming a jet of fire which fell upon the principal flow, set fire to it at the point where flames were desired, and was then shut off. The force of the discharge prevented the fire from creeping back to the flame-thrower, and by slowly changing his aim, the operator could move the flames where he wished. In addition to the intense heat, the burning of the tar products caused a thick gray smoke and an unbearable smell.

LIQUORS, *lik'erz.* See DISTILLED LIQUORS.

LIRA, *lē'rah,* the coin which is the basis of the monetary standard in Italy, having the same position as the dollar in the United States and Canada. A millionaire in Italy is one who has a million *lire.* The lira is a silver piece which circulates in the Latin Monetary Union (France, Italy, Switzerland, Belgium and Greece) at par with the French, Swiss and Belgian franc and the Greek drachma. It contains one hundred *centesimi* and is worth about $0.193 in American and Canadian money. Sometimes the same name is given to the Turkish coin of one hundred *piastres,* worth about $4.40. *Lira* is a corruption of the Latin word *libra,* meaning a *pound.*

THE LIRA
Obverse and reverse sides.

LISBON, *liz'bon,* the immediate successor of Venice in the early modern period as the maritime queen of the Western world, is the capital of Portugal. It is majestically situated on a low range of hills overlooking the Tagus River at a spot where that stream broadens to a width of nine miles, about seven miles from the ocean. In the background rises the lofty granite range of Cintra, and interspersed everywhere are semi-tropical gardens. Lisbon ranks next to Naples and Constantinople in regard to beauty of situation. Its harbor is one of the finest in the world—deep, well-sheltered and large enough to hold all the navies of Europe. The seeker after the picturesque must frequent the water front and the old section of the city which escaped the terrible earthquake of 1755; for the new quarter, constructed since that date, is decidedly modern, with wide, regular streets lined with fine homes and shops and adorned with many beautiful squares. The old quarter lies under the shadow of Moorish castle walls, and presents many curious sights along the steep narrow thoroughfares. Here no wagons pass, for the poor carry their burdens on their heads, and the more prosperous load down their donkeys. The cries of peddlers rend the air, and the vegetable venders still carry their stock in trade in baskets suspended from long sticks across their shoulders. Many Lisbon types are also found along the water front.

The finest structure in Lisbon is the monastery and church of Belem, a monument to the great seamen of Portugal, begun in 1500. The monastery is now used as an orphanage. The church of Estrella, with its dome of white marble, is a reduced copy of Saint Peter's at Rome. The former royal palaces are not of particular beauty. The government offices, the custom-house and the marine arsenal surround one of the city's finest squares, facing the bay. Here also are to be found a military arsenal, military and naval schools, libraries, academies of art and public schools of high standard. However, the arts and sciences are not in a flourishing condition. The manufacture of gold and silver wares, cotton spinning and weaving embrace Lisbon's leading industry; its exports, valued at over $20,000,000 annually, embrace wine, cork, fish, cattle, oil, salt and fruits.

Previous to 1147 Lisbon was taken three times by the Christians from the Moors. It has suffered severely from several earthquakes, and has been the victim of plagues. But the greatest disaster experienced was the earthquake of 1755, when in less than ten minutes

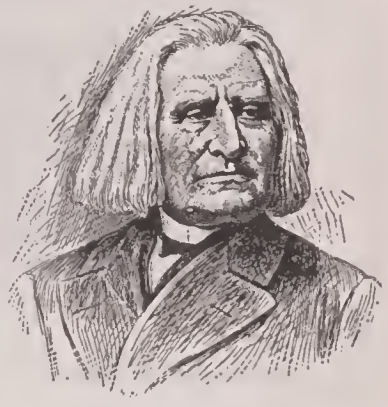
most of the city was reduced to a heap of ruins. About 40,000 of its inhabitants were killed, and the loss of property aggregated nearly $100,000,000. The nineteenth century was marked by many military revolts. Since the deposition of King Manuel in 1911 and the declaration of Portugal as a republic, the spirit of unrest, general throughout the republic, has left its impress upon Lisbon. Population in 1911, about 385,000.

LIS'GAR, Sir John Young, Baron (1807-1876), a British diplomat and statesman, Governor-General of Canada from 1869 to 1872. Lisgar, or "Sir John," as he was commonly known, was born at Bombay, India, and was educated at Eton and Oxford. He then began the study of law, but while still a student was elected to the House of Commons, in which he represented the same constituency for nearly twenty years. In 1852 he was given a place in the Conservative Ministry as Chief Secretary for Ireland, and three years later was sent to the Ionian Islands as Lord High Commissioner. In 1860 he became governor of New South Wales.

In 1868 the government offered him the Governor-Generalship of Canada, which had been declined by several other Conservatives because the Canadian Parliament was thought to have impaired its dignity by reducing the salary. Sir John, however, accepted the offer, and on January 2, 1869, was formally appointed Governor-General of Canada and governor of Prince Edward Island (the latter did not enter the Dominion until 1873). The Red River Rebellion was in progress when Sir John arrived in November, 1869, but it was suppressed in the next year. During his administration in Canada, Manitoba and British Columbia entered the Dominion, the Treaty of Washington was signed, and plans were perfected for the construction of the Canadian Pacific Railway. Sir John was a baronet by inheritance, and in 1870 was also created Baron Lisgar. At the close of his service in Canada he retired to his estates in Ireland, where he died.

LIS'TER, Sir Joseph (1827-), first Baron Lister, an English surgeon, distinguished for the introduction of antiseptics into surgery, was born at Upton, Essex. In 1854 he was graduated in medicine from the University of London; in the same year he became Fellow of the Royal College of Surgeons in England, and in 1855, of Edinburgh. He then became in succession professor of surgery at Glasgow, professor of clinical surgery at Edinburgh, and at King's College Hospital, London, and was appointed surgeon to the queen. The development of his theories regarding the efficacy of antiseptics in the treatment of wounds revolutionized modern surgery. His publications include many important books on the value of antiseptics. A modern antiseptic mouth wash, called *listerine,* was named for him.

LISZT, *list,* Franz (1811-1886), an Hungarian musician who ranks first among the great pianists of all time. The poetic quality of his playing, his ability and technique, combined with an intelligence, culture and enthusiasm for the high ideals of art, made him one of the most ideal personalities in this field of music. His influence in bringing before the public the work of Chopin, Berlioz, Wagner, Schumann and many others is incalculable. His pupils venerated him, and counted among them are many of the greatest masters of the pianoforte of the nineteenth and twentieth centuries. His transcriptions for the piano are considered the finest ever made. His Hungarian rhapsodies stand alone, and the list of his original compositions is long. His chief works are the *Faust* and *Dante* symphonies and the oratorios *Saint Elizabeth* and *Christus.*



FRANZ LISZT

Liszt was born in Hungary. He made his first public appearance in his ninth year. Later he studied in Vienna and Paris; in 1849 became director of the Court Theater of Weimar, and because of his wonderful concerts this little town became the center of the musical life in Germany. In 1861 he resigned his appointment, and his subsequent years were divided between Weimar, Rome and Budapest.

LITANY, *lit'a ni,* a form of prayer or supplication in which the people take responsive parts; it may therefore be called a dialogue of prayer. The word is derived from Latin and Greek words meaning *to pray.* Originally a litany was recited on special occasions and in processions, but now it is used at any time, and the individual may say both the prayers and the responses. This form of prayer is a supplication for grace or for deliverance from danger, pestilence or sin. The Roman Catholic, the Episcopal, the Lutheran and some other

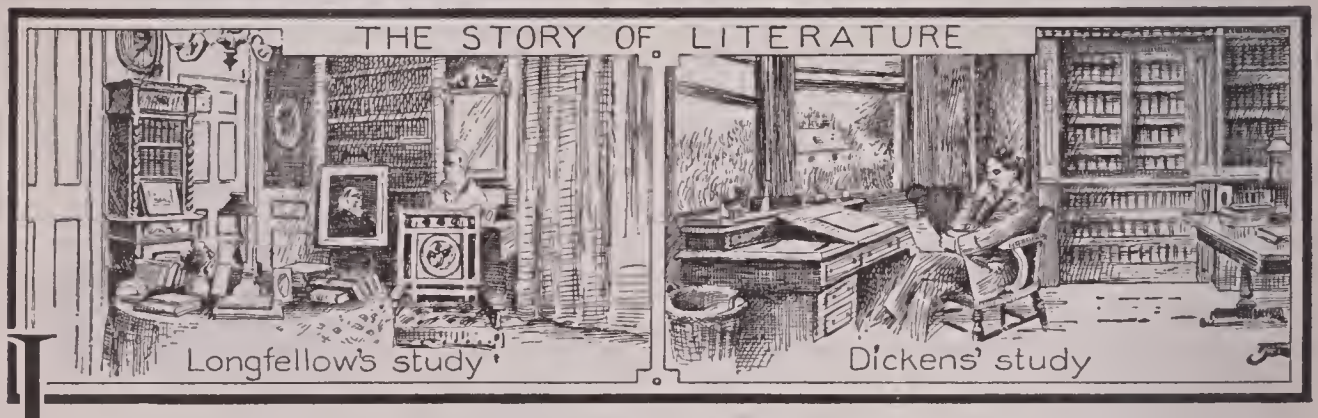
Protestant churches use the litany. The three litanies most commonly said in the Roman Catholic Church are the "Litany of Saints," the "Litany of the Holy Name of Jesus" and the "Litany of The Blessed Virgin." The first-named is used more frequently in consecrations and other solemn services. G.W.M.

LITER, *le'ter,* a measure of capacity in the metric system of weights and measures. It contains 61.026 cubic inches, and is equivalent to 1.0567 liquid quarts. A vessel three inches square and 6.8 inches high will contain approximately a liter of water. The liter is equal in volume to a kilogram of water at its maximum density, 32°. See METRIC SYSTEM.

One liter One quart

COMPARATIVE MEASURES

The liter is the official measure of capacity of liquids in all of Western continental Europe and in Spanish-America, including all the South American republics.



LITERATURE. This word, which is from the Latin, and means *letter,* is well known to every child, but like many other common terms, it is rather difficult to define. The simplest definition makes it include everything written or printed, on whatever subject; but that is making the true meaning far too broad. Perhaps it can best be described as "the best utterances of the human mind, as handed down in writing." In this form it would include nothing that is merely temporary in its appeal, as a "topical" song or jingle; nothing that is harmful, as the *Deadwood Dick* tales which the small boy hides when he hears his mother's footsteps; nothing technical, as the very latest treatise on mathematical astronomy. But beyond these, all that learning, imagination and inspiration have given to the world, all that writing has preserved and time has tested, is *literature.*

There are many kinds of literary productions, each with its own special appeal; there are poems, novels, short stories, essays, dramas, histories, letters, biographies, orations; but in order to make good its claim to be considered literature, each of these has to prove that it has in it something which can inspire and ennoble human character. The *form* counts for a great deal—a choice of words which are musical or forceful or particularly expressive; but the *spirit* is more.

Two Great Divisions. The most natural division of all literary works is into the two great groups of *prose* and *poetry.* If anyone who has not given the subject careful study were asked which is the simpler and which would naturally come first in the development of a literature, he could undoubtedly say prose. Molière in one of his charming comedies shows the amazement of a man of middle age when he suddenly awakens to the fact that all his life he has been talking prose. Most people can feel no such fresh, joyous surprise over so commonplace a matter—they have always known that they talked prose, the simpler form of literature, as it seems to them.

But a little study shows that prose literature does not naturally come first. Almost every old nation had its poetry long before it ever developed a prose style, and the reasons for this are plain. First of all, poetry stands for the emotion as prose stands for the reason; and the more primitive, the closer to nature men are, the more completely does their emotional life control their intellectual forces. They feel before they reason, and their feeling, whether it be religious or warlike, tends to express itself in poetry. Then, too, just because prose is such a commonplace, everyday affair, the idea of preserving it is slow in awakening. A patriot by his impassioned utterances stirs a people to successful protest against tyranny; they

feel the force of his words, but after all he is only talking to them, and what he has said another can say if occasion arises. But a poet, a man with the musical feeling, the love of rhythmic words well developed, makes a song about that same patriot, and the people chant it over and over, and hand it down as a valuable heritage to their children.

That brings up another point. There is a long period in the early literary history of every people when its productions are not written, but are passed from one generation to the next by word of mouth, and there poetry has the advantage because its rhythm makes it far easier to remember. For all these reasons, and some others, poetry practically always comes before prose.

The Earliest Forms. Another interesting fact in connection with the beginnings of literature is that almost every people, if it works out its own literary history, unaffected by other peoples further advanced, begins with practically the same kinds of poetry. There are religious utterances, either hymns to some deity or pleadings from religious leaders to their followers, and there are war songs. These two types seem to express the most primitive emotions of practically every people. Sometimes the two are combined, as in Homer's great poems, which tell of the gigantic struggles of the early Greek heroes and also of the marvelous doings of the gods.

How Literatures Are Indebted to Each Other. This mention of Homer brings the discussion to the point from which any account of European and American literature must start —to the literature of ancient Greece. This article makes no attempt to treat historically the literatures of the various countries; they are treated under separate headings. The various types, too, as poetry, drama, fiction, have articles of their own in these volumes, but the dependence of the various literatures upon one another is an interesting point which may well be emphasized.

At first the statement that literature really completed its evolution in ancient Greece and that no totally new form has been invented since may seem startling and perhaps untrue; but thought and study show its justice. Never has the epic been brought to greater perfection than in those works credited to Homer; never were more exquisite lyrics written than those of Sappho, or more wonderful tragedies than those of the "great three," Aeschylus, Sophocles and Euripides. History, oratory, philosophy, criticism, all these the Greeks brought to a high point of perfection, and their myths and legends are as delightful as any modern tales. There have been special developments of certain branches of literature, it is true, but the Greeks began them all, inventing them themselves, apparently owing no debt to any older nation.

And from this foundation of Greek literature have flowed all the streams of modern European literature. The Romans were frank imitators, developing only a few forms in greater perfection than their predecessors. With the spread of Christianity there was a change. Christian writers abhorred the pagan literature of Greece and turned to the sacred books of the Hebrews for their inspiration; but when, after the passing of the Dark Ages, with their minor efforts, there came that marvelous awakening known as the Renaissance (which see), Greek literature came into its own again.

In the new, modern Europe the foremost nation from a literary point of view was France. Romances of chivalry, allegories and religious dramas were prevalent during this French period, which lasted from the twelfth to the late fourteenth century. Then Italy had its day, and every literature of Europe felt the Italian influence. Later, a greater individuality became evident, each nation developing forms which best suited its own peculiarities and genius, but from time to time there is clearly visible in the writings of English authors the influence of various continental countries. England itself, largely because of its island position, never gained any general intellectual supremacy, though certain of its authors were widely read on the Continent; but just for that very reason, because England drew from other literatures more than it gave out to them, the student of English literature cannot really understand what he studies without some knowledge of the literatures of other European countries.

When one begins the study of the literatures of Canada and the United States, it is obvious that they cannot be considered except in connection with that of England. Each country has made its own special types, in accordance with its varying conditions of life, but the influence of the parent English stream is visible throughout; and it is not lack of patriotism but a wise desire to follow the stream from its source which decrees that a study of the literature of England shall be preliminary to that of either of its American descendants.

The Study of Literature. Some schools lay most stress on science, some on mathematics,

some on languages, ancient or modern; but no school attempts to plan a course of study which omits literature, for no one questions for a moment its supreme importance. To present reasons why it should be studied seems like gilding refined gold or perfuming the violet—the very definition describes it as "the *best* utterance of the human mind," and it surely needs no argument to convince anyone that he should, so far as possible, acquaint himself with this best. In the first place, the study of literature gives more genuine pleasure than almost any other study, and is so adaptable that it fits the requirements of every student, be he child or man. One person has no liking for fiction. Why spend time reading about a lot of people who never lived and a lot of things that never happened? he demands. For him, then, there is history no less exciting than a novel, but with the saving grace of truth. There is Prescott's *Conquest of Mexico,* parts of which no boy can read without a thrill; there are Parkman's tales of the fascinating pioneer days in the western regions of North America; there is Motley's *Rise of the Dutch Republic;* and there are scores and hundreds of other books which will acquaint the fact-hungry reader with the story of the world's life.

Another reader finds history "dry," but delights in poetry, which is literature at its highest and best; another finds pleasure in essays grave or gay, in which thoughtful men have given their views on subjects of wide interest; still another finds most attractive the study of types of human character as set forth in great novels. But wide as are the variations in human tastes, the variations in literature are even wider, and no honest seeker for literary pleasure need go away unsatisfied; moreover, there is a constant volume coming from the presses.

Another thing which literature gives is information. A person cannot travel everywhere, meet people of all types, converse with men of all minds; but by means of the printed page he may do all that, even journeying back into the past and making the acquaintance of great men who have lived in all times. "What would we not give," someone sighs occasionally, "if there had been cameras in the days of Caesar that we might know just how he looked; if there had but been phonographs in the time of Lincoln, that we might hear his very words!" But Caesar's writings give a more accurate estimate of the man than could any camera, and Lincoln still speaks in the sayings which literature has preserved for us.

But by no means the least of the reasons for studying literature concerns its inspirational power. It is impossible to estimate in any way the good that literature has done in this way. This does not mean that it actually urges to effort; "didactic" literature, or that which strives to teach, is by no means the highest type. But literature presents, both in history and in fiction, types of men who have achieved; it shows the motives which have guided the world's great men, the forces of which they have made use in overcoming their obstacles. And this is not all. Merely by filling the mind with lofty thoughts, even if it touches not at all on the so-called "practical" side of life, it makes for better character, for higher ideals. Such lines, for instance, as these of Phoebe Cary's—

> If a task is once begun,
> Never leave it till it's done;
> Be the labor great or small,
> Do it well or not at all,

have a very obvious lesson to teach, and it may be that just that compact, rhymed way of putting the matter may be helpful to some readers; but there is no less inspiration in sheer beauty, in such lines, for instance, as these of Henley's—

> A late lark twitters from the quiet skies,
> And from the west,
> Where the sun, his day's work ended, lingers as in content,
> There falls on the old gray city an influence luminous and serene,
> A shining peace.

How Literature May Be Studied. This is a broad topic, too broad for complete discussion here; but a number of general suggestions may be offered. Studying a piece of literature is a different thing from merely reading it, aiming as it does at getting from it all that it contains; but one precaution should be observed. Any writing, whether poetry or prose, should never be studied so long and so closely that the student is bored and loses all feeling of pleasure. Such a danger is greater with poetry than with prose. Perhaps the child in fifth or sixth grade has a favorite poem—it may be Bryant's jolly little *Robert of Lincoln.* When he finds that the class is to make a study of the poem he is delighted—it gives him a pleasant sense of ease and familiarity. This persists for a time, but as he is compelled to study the poem for rhyme and for rhythm, to trace every unusual word to its source, to look up the habits of the bird that he may know whether the poet has described them correctly, to find the meaning of

every allusion, he begins to hate the sound of the merry jingle, and to wish that he need "never hear that old poem again." This is most unfortunate, as it is far more important to foster the child's love for poetry than to instruct him in the intricacies of rhyme and rhythm.

But it is always possible to stop just short of the point where pleasure ceases, and still to gather a goodly store of information. In studying poetry, the pupils will enjoy picking out the words which they never use in their everyday conversation and trying their own substitutes in the poem; they will enjoy comparing different poems to see whether the "music" is the same; and sometimes they may profitably rewrite portions in their own words. This paraphrasing, however, once very popular, is much less used at present, for in the case of real poetry, with beauty and music, it is far better to let the pupils keep the idea in the original words. If exercise in paraphrasing is desired, it should be employed on poems which have not been studied for their literary beauty.

When stories are the subject of study, the different phases of plot, character, description and emotion may be touched upon even with young pupils. This entire subject is treated fully under the heading of FICTION. Then, too, there is the department of the history of literature, in certain departments of which children can be brought to take a real interest. They are certain to enjoy any selection more if they know something about the author who wrote it, and perhaps about the circumstances under which it was written. What child would not feel an increased delight in the stories of Hans Christian Andersen if he were told of the strange childhood of that master of fairylore, or of the extraordinary things he used to do in the days of his fame? What child could resist the appeal of Dickens' sad boyhood, or of Longfellow's sincere love for children? It is just here that these volumes will supplement any study of literature, for they contain articles on all the world's distinguished writers, and especial care has been taken to include in these such facts as will interest children. C.W.K.

Literature for Children

Directing Children's Reading. The wealth of literature is on every hand, and all are prone to regret the lack of time for exploring its treasures. We must acknowledge, however, that often the little time afforded for reading is wasted over trivial and transient material. This is due to a lack in early training.

Children may easily be directed towards literature which will entertain, instruct and develop a love for that which is good in content and excellent in form. The history of individual children so trained by careful and competent parents and teachers shows to all the natural way to reveal to the young the joys of the world of books—joys conserved for our delight by master-minds through the ages.

Perhaps a five-foot shelf will hold all that is best in pure literature, but the choice of titles must be made from thousands of volumes, many of them of little value. To assist in making that choice should be the duty as well as the pleasure of the child's elders who must realize that a taste for that which is good in literature must be fostered in youth or the man will seldom possess it. The mother may sing the songs and recite the lyrics that will appeal to the child's musical ear and give him a feeling for rhyme and rhythm. In kindergarten and throughout the elementary grades this exercise should be continued—the reading aloud by the teacher or mother of the most musical literature that appeals to the ear and awakens spiritual joy, which little people may possibly obtain in no other way. The children, too, as fits their ability, should be encouraged to read with appreciation of the beauty of expression the simplest poetry and prose of the greatest masters of style. Children should store the memory with literary gems; upon these they will frequently draw in after years to find comfort and inspiration.

In the selection of juvenile literature the individuality of the child will be considered, but a foundation of classic stories in prose and poetry that have lasted for many years and appealed to the children of many generations may well be given to all. The children of our time should have the jingles of *Mother Goose* for the tickling of their fancy and their sense of humor. The fairy stories of Perrault, of Grimm and Andersen belong to the kingdom of childhood by their imagination, humor and sense of justice.

The love of out-of-doors is inherent; all children are drawn to the little Indian boy Hiawatha and become veritable dwellers by the big-sea water, talking with the birds and playing with their brothers, the squirrel and

the rabbit. The common things of life, the sun, the rain, the flowers, the stars, the rainbow, the song of birds—all are lifted into the realm of imagination and make a strong appeal to the hearts and minds of the children. Longfellow wrote this poem for his own peers, but the thought often persists when having the children dramatize many scenes from Hiawatha's adventures, how the poet who so loved little children would be moved almost to tears could he hear their limpid tones repeat:

> From the red stone of the quarry
> With his hand he broke a fragment,
> Moulded it into a pipe-head,
> Shaped and fashioned it with figures;
> From the margin of the river
> Took a long reed for a pipe-stem,
> With its dark green leaves upon it;
> Filled the pipe with bark of willow,
> With the bark of the red willow;
> Breathed upon the neighboring forest,
> Made its great boughs chafe together,
> Till in flame they burst and kindled;
> And erect upon the mountains,
> Gitchie Manito, the mighty,
> Smoked the calumet, the Peace-Pipe,
> As a signal to the nations.

The world of art—pictures, sculpture and literature itself—is so based upon the stories of Greek and Latin literature that an early knowledge of their myths is almost invaluable. Based upon the phenomena of nature, to the children they appeal as stories of a by-gone day, giving delight to the imagination and peopling the fancy with bright, attractive beings. The sculptor has embodied his thought of Greek myth in numerous forms, and a knowledge of the source of the sculptor's inspiration, of what he is trying to shape in marble, enables us to understand, appreciate and enjoy his work. The painter also owes a great debt to Greek literature, and in every gallery we see the artist's conception of Aurora, or the fall of Troy, or of some hero or episode described by the Greek poets. Much is revealed to the visitor whose memory has been stored with the wealth of imagination that belonged to the early writers of our race—meanings, details, beauties that are not seen, or if seen, are not understood by others. Numerous books based upon the two great poems the *Iliad* and the *Odyssey* are in every public library ready for the teacher's use. She should have the poems themselves in her own collection, should know them and should make frequent reference to them.

In music the stories of the romances of the Middle Ages and the Scandinavian legends are largely drawn upon for themes and operas. They are fascinating stories in themselves and embody many characteristics of the brave people of the North. The heroes of Asgard, the struggle between the gods and the powers of evil destiny, the grandeur of scenery, the struggles of the elements, all the poetry of wind and wave and sky as revealed to those undaunted rovers of the sea, are all vividly portrayed in the myths of the North. We should remember this element in our historical development and see that the children have these stories as a background for all literature, art and music.

Milton's *Comus* is a play that should be given to the children that they may become interested in this gifted poet, though it is not generally considered as appealing to the young. This play is a dramatic presentation to the child's open mind of the beauty of goodness—shown in the childish characters—and the line, "Virtue alone is free," sings itself into his consciousness, awakening a responsive chord. *Robin Hood* and *The Idylls of the King* delight children at a time when adventure and romance and hero-worship have their day in the life of the young.

Meeting our greatest poet, Shakespeare, for the first time in that fairy play which is always a favorite, *A Midsummer Night's Dream,* the children happily continue to live with him in the story of *Julius Caesar,* in *The Tempest,* in *Macbeth* and in *Hamlet.*

As children reach the upper grades of school they should read such plays as *Julius Caesar, Henry VIII, Antony and Cleopatra,* and the like, in connection with their history lessons dealing with the same themes. The plays are not all historically accurate, but the divergence is not great enough to destroy their benefit. It will be well to note the discrepancies, as study proceeds.

It is difficult to interest children in ethereal questions directly, but the study of the contrasting characters of Macbeth and Banquo, of Cassius and Brutus, the discussion of motives underlying the actions of different types as revealed in the dramas, the close study of the great arguments where questions of morals are discussed with such skill, all form a possession that will always remain to strengthen and to inspire, to delight and to console.

The best literature is none too good for the children. The greatest writers use the simple, direct style characteristic of good writing; they fill the mind with images of beauty, and the emotions are appealed to through ennobling sentiments. F.H.

Graded Lists for Study

The following lists, divided by grades, suggest a wide range of literature for children, whether for reading or for study. The divisions between the grades are not unchangeable, for some children in the fifth grade are better able to appreciate good literature than are many eighth-grade pupils.

Grades One to Three

A Child's Garden of Verses.....
.....Robert Louis Stevenson

Grimms' *Fairy Tales*—selected. Not all of these stories are suitable for children's reading. They were not written for children in the first place, but were studies in folklore, and while children of all countries have delighted in them, there are some among them which are coarse. Volumes of selections which are all that any teacher could desire are easily procured.

Aesop's Fables.

Lullaby Land .....Eugene Field

Tanglewood Tales and *Wonder Book*.....
.....Nathaniel Hawthorne

Alice in Wonderland and *Through the Looking Glass* .....Lewis Carroll

Just-So Stories .....Rudyard Kipling

Poems.....Henry Wadsworth Longfellow

By no means all of these are suited for children of this age, but *Hiawatha*, as well as many of the shorter poems, will appeal to them. It is one of the books with which children should become familiar early, since it contains material fitted for all ages.

Wild Animals I Have Known.....
.....Ernest Thompson Seton

Grades Four to Six

Norse Myths

These are retold in various forms for children. Hamilton Wright Mabie has a volume called *Norse Stories Retold from the Sagas*, and there is a delightful book called *In the Age of Giants* by Abbie Farwell Brown.

The Heroes .....Charles Kingsley

Grandfather's Chair.....Nathaniel Hawthorne

Robinson Crusoe.....Daniel Defoe

Swiss Family Robinson...Johann Rudolph Wyss

Jungle Books .....Rudyard Kipling

Adventures of Ulysses.....Charles Lamb

Frauconia Stories .....Jacob Abbott

Story of a Bad Boy.....Thomas Bailey Aldrich

Animal Story Book.....Ernest Thompson Seton

Little Lord Fauntleroy.Frances Hodgson Burnett

Sarah Crewe .....Frances Hodgson Burnett

Little Lame Prince...Dinah Maria Mulock Craik

Nights with Uncle Remus..Joel Chandler Harris

Fairy Tales .....William Hauff

Bible Stories..Edited by Richard Green Moulton

Hans Brinker.....Mary Mapes Dodge

Water-Babies .....Charles Kingsley

Animal Story Book.....Andrew Lang

True Story Book.....Andrew Lang

Nonsense Books .....Edward Lear

Book of Verses for Children.....E. V. Lucas

At the Back of the North Wind.....
.....George Macdonald

Rebecca of Sunnybrook Farm.....
.....Kate Douglas Wiggin Riggs

Flamingo Feather .....Kirk Munroe

Old Indian Legends.....Zitkala-Sa

Seventh and Eighth Grades

Leatherstocking Tales...James Fenimore Cooper

The Spy .....James Fenimore Cooper

Ivanhoe .....Sir Walter Scott

Kenilworth.....Sir Walter Scott

Pilgrim's Progress.....John Bunyan

Little Women .....Louisa M. Alcott

Little Men .....Louisa M. Alcott

Eight Cousins .....Louisa M. Alcott

Arabian Nights.

John Halifax, Gentleman.....
.....Dinah Maria Mulock Craik

Ballad Book .....Katherine Lee Bates

Merry Adventures of Robin Hood..Howard Pyle

Story of King Arthur and His Knights.....
.....Howard Pyle

Child's History of England.....Charles Dickens

Oliver Twist.....Charles Dickens

Tales from Shakespeare...Charles & Mary Lamb

Puck and Pook's Hill.....Rudyard Kipling

The Nurnberg Stove.....Louisa de la Ramee

A Dog of Flanders.....Louisa de la Ramee

A Man Without a Country..Edward Everett Hale

Book of Saints and Friendly Beasts.....
.....Abbie Farwell Brown

King of the Golden River.....John Ruskin

Rip Van Winkle and *The Legend of Sleepy Hollow* .....Washington Irving

True Bear Stories.....Joaquin Miller

Squirrels and Other Fur-Bearers.John Burroughs

Treasure Island.....Robert Louis Stevenson

In the Boyhood of Lincoln.Hezekiah Butterworth

Tales Out of School.....Frank R. Stockton

Lost in the Jungle.....Paul Du Chaillu

Hoosier Schoolboy.....Edward Eggleston

Lays of Ancient Rome.....Thomas B. Macaulay

Boys' and Girls' Plutarch.

Gulliver's Travels .....Jonathan Swift

This must of necessity be a special young folks' edition.

Consult Burt's *Prose That Every Child Should Know;* Field's *Finger Posts to Children's Reading;* Johnson's *Outline History of English and American Literature.*

Related Subjects. The following articles have to do with some phase of the general subject of literature. These volumes contain in addition hundreds of biographies of writers, which furnish in effect a history of the literatures of the most important countries, and the reader is referred for classified lists of these to the indexes at the close of such articles as HISTORY, NOVEL, POETRY, etc.

Allegory
Alliteration
Almanac
American Literature
Anthology
Augustan Age
Autograph
Ballad
Bard
Belles-Lettres
Bible
Bibliography
Bibliomania
Biography
Blank Verse
Burlesque
Canadian Literature
Classics
Comedy
Debate

Dictionary
Didactic Poetry
Drama
Edda
Elegy
Encyclopedia
English Literature
Epic
Epigram
Essay
Fable
Farce
Fiction
Figure of Speech
French Literature
German Literature
Greek Literature
Hebrew Language and Literature
Idyll
Irish Literature
Legend
Letters
Lyric Poetry
Manuscripts
Masque
Melodrama
Metaphor
Meter
Metonymy
Minstrel
Miracle Play
Morality Play
Mystery Play
Novel
Ode
Oration
Palimpsest
Parable
Parody
Passion Play
Pastoral Poetry
Poet Laureate
Poetry
Prose
Proverb
Rhyme
Romance
Romanticism
Sagas
Satire
Skalds
Sonnet
Spenserian Stanza
Tragedy
Troubadour
Trouvere

SPECIFIC REFERENCES

Aeneid
Aesop's Fables
Aladdin
Ali Baba
Alice's Adventures in Wonderland
Anabasis
Ancient Mariner, The
Arabian Nights
Autocrat of the Breakfast Table
Barbara Frietchie
Barmecide's Feast
Becky Sharp
Ben-Hur
Beowulf
Biglow Papers
Bluebeard
Camille
Canterbury Tales
Casabianca
Charge of the Light Brigade
Cid, The
Cinderella
Courtship of Miles Standish
Don Juan
Evangeline
Figaro
Galahad, Sir
Godiva, Lady
Grimms' Fairy Tales
Hamlet
Hiawatha
Idylls of the King
Iliad
Junius Letters
Kenilworth
Lake School
Lancelot
Les Miserables
Lochinvar
Macbeth
Mahabharata
Mephistopheles
Merlin
Midsummer Night's Dream
Mother Goose
Nibelungenlied
Nicholas Nickleby
Odyssey
Paradise Lost
Pickwick Papers
Poor Richard's Almanac
Ramayana
Rip Van Winkle
Robinson Crusoe
Roland
Round Table, Knights of the
Scarlet Letter
Utopia
Vedas

LITHIUM, *lith'ium,* a soft, silver-white metal, and the lightest known solid. It is a little over one-half as heavy as water, and it floats on petroleum. When cut, lithium has a silvery luster, but it soon tarnishes when exposed to the air. It is softer than lead and harder than sodium. When thrown on water it decomposes the water and sets the hydrogen free. Lithium does not occur in a free state, but is found in solution in some mineral waters. It is usually obtained by separating it from its melted chloride by a strong electric current. It forms numerous compounds, some of which are valuable in medicine, while others are used to impart a red color to fireworks.

LITHOGRAPHY, *li thog'ra fi,* the art of drawing pictures, designs or writing on a stone or metal surface, in such a manner that the impression may be reproduced by printing. The plate is so treated that only the design traced by the pen or crayon will take up the ink, while the rest of the plate remains clean.

The Process. The stone used in lithography is a porous variety of calcium carbonate, found chiefly in Bavaria. The best stones are light gray in color. They are delivered in slabs from three to four inches in thickness and in sizes ranging from six by eight inches to forty-four by sixty-four inches. More recently zinc and aluminum have been substituted for stone. Excellent plates are now made of aluminum; they are convenient because they are flexible, uniform in quality and less easily broken.

When stone is employed, the treatment of the surface depends upon the instrument to be used. The surface is ground and left slightly roughened for the lithograph crayon; when a pen is to be used, the stone is polished with pumice stone. In one method, the design is drawn on the grained surface with crayon; it is an exact copy of the object, but turned upside down, like type in printing. The plate is then washed with a solution of gum arabic and acid. The acid decomposes the soap of the crayon and leaves the surface chemically prepared to take up fatty ink. The gum water covers the untouched portion of the stone with a film. Turpentine is then applied and an inked roller is run over the surface. The design readily absorbs the fatty ink, while the moist, gummed surface resists it. When a pen is used, the design is drawn with small dots on the polished surface. This is called pen-stippling.

Another process is by engraving. A smooth stone is first prepared with gum water. Its surface is then covered with lampblack or some other pigment, and the picture is scratched with a steel needle. When the design is completed, the stone is oiled, the oil being readily absorbed by those portions of the stone laid bare by the needle. The gummed surface here again

resists the ink, which the oiled surface readily absorbs.

Printing was originally done on a hand press. The flexible aluminum plate, however, has made it possible to print on the rotary press, which prints two or more colors in succession. See PRINTING PRESS.

Color Process. This consists in reproducing the natural colors of the object. As many as thirty tones and an equal number of printings may be used, but for ordinary purposes the number is much less. Each color or tone is laid on a special plate and great care must be taken to see that the colors do not overlap and that they are exactly placed in the finished picture. A key or a series of registering marks on the margins of the plate guide the printer.

Photolithography. Photography is now used in conjunction with the lithographic process. In this process a photographic reproduction of the original on stone serves as a basis for the various color plates. A half-tone negative is placed on a stone previously coated with a solution of albumin and bichromate of potassium. The solution will be affected only by such light as can pass through the negative. Turpentine is then used to dissolve the unaffected parts and a positive is left on the stone. See PHOTOGRAPHY.

The progress of lithography since its invention in 1798 has been remarkable. The Germans, who discovered the process, early used it to reproduce the paintings of the great masters, but its high artistic possibilities were first revealed by French artists. However, other processes are largely superseding lithographic processes, because of the greater cost of the latter. The advent of the present-day half-tone illustrations, the so-called three-color and four-color painting from half-tone plates and what are known as the rotogravure and offset processes, are crowding lithography for supremacy. G.B.D.

Consult Rhodes' *Art of Lithography;* Brown's *Practical Text Book of Lithography.*

LITHOTOMY, *li thot' o mi,* from two Greek words, *lithos,* meaning *stone,* and *tamein,* meaning *to cut,* is a surgical operation for removing stones which form in the gall bladder, the bladder, the kidneys or the biliary ducts. Formerly the operation was very serious, but modern surgery has made it a safe minor operation, performed in a few minutes. The wound heals within a month.

LITHUANIA, *lith u a' ni a,* a region in the eastern part of Europe that is now included in the Russian governments (provinces) of Kovno, Vilna, Grodno, Vitebsk, Minsk, Mogilev and Suwalki. In 1569, Lithuania, then an independent realm, was merged with Poland into a single state. When Poland was dismembered, in 1792, 1793 and 1795 (see POLAND, subtitle *History*), Lithuania passed to Russia, and at that time it had an area of about 100,000 square miles. The country is forest-covered or marshy, and the productive areas of soil are limited. It is watered by the Dnieper, Pripet, Berezina, Dvina, Niemen and Bug rivers. The people are Lithuanians (including Letts), Russians, Poles and Jews. The Lithuanians, who probably number about 2,000,000, are a well-built people and represent a distinct physical type, having fair hair and skin, blue eyes and long thin nose and thin lips. They are woodmen, teamsters and tillers of the land. Their language is much like the Old Prussian, and their literature consists chiefly of folk-songs and religious tales. During the decade which closed in 1915 nearly 172,000 Lithuanian immigrants were registered at Ellis Island, New York. The territory of the Lithuanians is included in that section of Russia invaded by the Germans in 1915 (see WAR OF THE NATIONS), and held successfully by them until the close of the war.

LIT'MUS, a coloring matter made from lichens, used by chemists as an indicator because it turns red in the presence of acids and blue or deep violet in the presence of alkalies. It is used either as a solution or in the form of red or blue test papers. A chemist neutralizing an acid solution adds alkali until the red of the litmus fades to violet; one more drop turns it blue. With test paper, the solution is shown neutral when neither the red nor the blue is changed by moistening with the solution. See LICHENS.

LITTLE FALLS, N. Y., in Herkimer County, in the east-central part of the state, is situated in a narrow pass between foothills of the Adirondack and Catskill mountains. Through this natural gateway runs the Mohawk River, the Erie Canal, the New York Central and the Little Falls & Dolgeville railroads and the New York State Railway, an electric line. The population, which in 1910 was 12,273, was 13,451 (Federal estimate) in 1916.

A portion of this picturesque city is built upon the steep sides of the hills. Prominent public buildings include a city hall, a Federal building, Y. M. C. A. building, Masonic Temple, Saint Mary's group of buildings—church, school and deanery, and a public library and a hospital.

The Mohawk River here falls forty-four feet in less than a mile of its course, in a series of little cascades, which suggested the name of the town. By means of a dam power is furnished for industry. Sectional bookcases, incubators, knitting machines, bicycles, hammers, paper, lumber and knit and felt goods are the principal manufactures. Little Falls is the trade center for the surrounding agricultural country.

A settlement was made here by Germans in 1782, which was destroyed by British sympathizers and Indians. In 1790 the place was resettled; it was incorporated as a village in 1811 and as a city in 1895. W.E.W.

LITTLE ROCK, Ark., the capital of the state and the county seat of Pulaski County, situated in nearly the geographical center of the state, on the Arkansas River, 145 miles southwest of Memphis, Tenn., and 140 miles southeast of Fort Smith. Three railway lines, the Saint Louis, Iron Mountain & Southern, the Chicago, Rock Island & Pacific and the Saint Louis Southwestern, enter the city. In population Little Rock ranks first in the state; the Federal estimate of 57,343 in 1916 is a great increase from 45,911 in 1910.

Location. The city occupies both banks of the river and extends westward to the foothills of the Ozark Mountains. It was built originally on a rocky bluff fifty feet above the south bank. To early settlers this bluff seemed little compared with the bold elevation about ten times higher on the opposite bank, then three miles distant, which was called the *Big Rock.* Hence the town received the name of Little Rock. Fort Logan H. Roots occupies the site on the high bluff. The river, here spanned by four bridges, is navigable to Little Rock almost all the year. The principal park is in the heart of the city and covers thirty-five acres.

Buildings and Institutions. With the exception of the state university at Fayetteville and a branch of the Normal Institute for colored students at Pine Bluff, all of the state's institutions are located in Little Rock. Here are the state capitol, built of Arkansas marble, the school for the blind, the state penitentiary, insane asylum, deaf-mute institute and state reform school. The granite county courthouse, the Federal building, Board of Trade and Masonic Temple are among the notable buildings. Little Rock is the seat of the United States District Court for the state. It has a Weather Bureau station and a United States arsenal. For higher education there are the Arkansas Military Academy, a military training school for boys; Maddox Seminary, for young ladies, and Philander Smith College, for colored youth.

Commerce and Industry. Little Rock has an important trade in cotton, lumber, bauxite ore (largely used in preparations of aluminum and alumina and employed in lining furnaces exposed to great heat), and in agricultural and manufactured products. The surrounding country has a large yield of cotton, and upon it depend the leading industrial establishments of the city. These are gins, compresses, cottonseed-oil and cottonseed-cake factories, the output of oil being especially large. Besides these the city has railroad shops, bauxite-crushing plants, twine factories and creosoting plants, and in the vicinity are granite quarries. The recent establishment of five wood-working plants shows that the city is rapidly becoming a lumber center of importance.

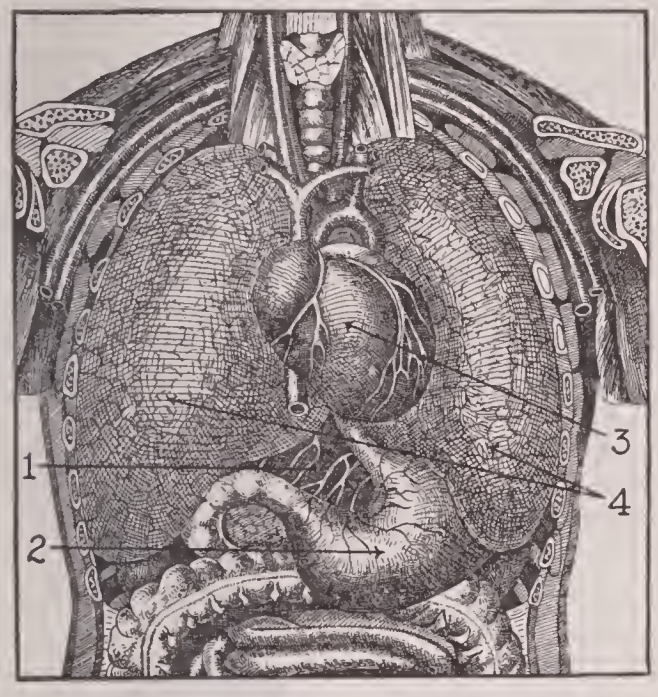
History. A settlement was made here in 1814 In October, 1820, with a population of less than twenty, it became the territorial capital, but it did not become a town until five years later; in 1835, by special act, it was incorporated as a city. During the War of Secession Little Rock was taken by the Federal forces and it remained in their possession until the close of the war. Since 1880 the population of Little Rock has steadily increased. J.S.C.

LITURGY, *lit'ur ji,* from a Greek word meaning a *public service,* is a form of worship, especially applicable to the celebration of the Lord's Supper. The word is frequently used in the Old Testament with reference to the public ceremonies of the Hebrews; in the New Testament it denotes any form of divine worship. Modern liturgies may be divided into two great groups, the Eastern and the Western. The former includes the *Syrian rite,* a Syriac version of which is still used by the Maronite Church of Mount Lebanon; the *Persian rite,* which is in the Syriac language, and is now used by the sect of Nestorians, many of whom have recently joined the Orthodox Eastern Church and use its liturgy; the *Byzantine rite,* the most important of all the Eastern forms, used throughout the world in different languages, and which is the rite of the great Russian Church, of the Greek Church and of less important centers of worship; and the *Egyptian rite,* a version of which is still used by the Copts.

The Western liturgies consist of the Latin and the Vernacular, the former represented by the Roman Catholic mass, and the latter by the forms used by various Protestant churches. The first half of the nineteenth century wit-

nessed a notable revival in the study of liturgies, both in England and America, and there is a growing disposition on the part of Christian churches generally to adopt liturgical services.

LIV'ER, the largest glandular organ of the body. It weighs from three to four pounds, is a soft and easily-crumbled mass, of a dark red or chocolate color. The liver lies on the right side of the abdominal cavity. It has a concave,



LOCATION OF THE LIVER
With respect to other organs: (1) the liver; (2) stomach; (3) heart; (4) lungs.

or outward-curved upper surface, which fits closely into the diaphragm. It is flat and irregular below and thicker behind, touching the intestines and the right kidney with the lower surface. Five ligaments hold it in place. It is divided by fissures, or grooves, into five lobes, the largest on the right. The hepatic artery and portal vein carry blood to the liver, and the hepatic duct conveys the bile to the gall bladder, a pear-shaped sac below the liver.

The liver has a number of very important functions. It receives blood from the stomach and the intestines through the portal vein, which divides in the liver into a network of capillaries. This blood in passing through the liver is freed of its waste matters and poisons; the liver cells also take out of the blood some of its sugar content, changing it into a kind of animal starch called *glycogen.* Glycogen is stored away in the liver cells to be given out again as sugar when it is needed by the blood. Sugars and starches in the blood are also changed into fat, part of which is poured into the blood and part stored away in the cells of the liver. This organ also manufactures bile, an important digestive fluid. Because the liver acts as a destroying agent of various poisons brought into the body, it often becomes itself diseased. That is why persons who have suffered from malaria, dysentery and other germ diseases are liable to have some form of liver trouble. Overactivity of the liver may cause the disease known as diabetes. J.H.K.

Related Subjects. Reference to the following articles in these volumes will broaden the reader's knowledge of this topic:

Arteries	Diabetes
Bile	Gall Bladder
Circulation of the Blood	Veins

LIV'ERMORE, Mary Ashton Rice (1821-1905), an American lecturer and woman suffragist. She was born in Boston, and first came into public notice during the War of Secession. Her services on the Sanitary Commission and her speeches in support of the cause represented by that organization brought her into national prominence. She was active in the temperance movement for many years, and was well known as a writer on religious subjects. She was editor of the *Woman's Journal* of Boston at one time, and published a great many books. After the war Mrs. Livermore became an active advocate of woman suffrage, and her ability as a public speaker gained her notable success on the lecture platform.

LIV'ERPOOL, the second largest city in England and one of the greatest commercial centers in the world. It is situated on the River Mersey, three miles from its mouth, and is 201 miles northwest of London. In Liverpool "Trade is enthroned, with cotton as Prime Minister." However, not cotton alone, but nearly all the grain, dressed meats and other produce shipped from Australia, Canada and the United States to England enter through the port of Liverpool; while most of the exports from the kingdom to these countries leave from this city, whose docks are well equipped to handle this immense trade. They extend along the river for seven miles. Because of the strong tide at that point, forty great docks have been constructed, all joined together and surrounded by strong stone walls, within which are immense floodgates,

LOCATION MAP

opened only to permit vessels to pass at high tide.

In addition to the city's export and import activities, considerable home trade has been developed through its extensive shipbuilding yards, iron and brass foundries, rice and flour mills, sugar refineries, glass works and watch factories. Not far from the busy water front are located the Exchange and the Town Hall. These buildings cover over two acres of ground. In the great news room of the Exchange, with its splendid decorations and fine stained-glass dome, merchants and brokers gather daily amid exciting scenes. The newer and better parts of Liverpool are on the highlands back of the river, where stand some of the finest public buildings in the world. Chief among these is Saint George's Hall, constructed from the profits arising from the docks; it contains many court rooms and halls used for public gatherings and educational purposes; its organ is one of the largest ever made.

Nearby are located the Free Library and Museum, the Walker Art Gallery and the Picton Reading Room, each affording many opportunities to all who would take advantage of them. The city is well supplied with schools of all kinds, and contains about 275 churches. The waterworks, lighting system and street cars are owned and operated by the municipality. The residence portion contains many fine, open squares surrounded by beautiful homes; on the outskirts are four parks, of which Sefton Park and the Zoölogical Gardens are exceedingly interesting.

The rise of Liverpool has been remarkable. In the middle of the fourteenth century it contained only 840 inhabitants and about 170 cottages. In 1911 it had a population of 746,400, and its houses compare with the finest of any city. Between this city and Manchester there was opened in 1830 the first important steam railroad ever constructed (see RAILROAD). Liverpool has been the home of many famous men and women, among whom are John Sadler, inventor of painting on pottery; Mrs. Hemans, poet; Benjamin Spence, sculptor; William Roscoe, poet and historian, and E. H. Sothern, actor. Among the writers included in the "Liverpool School" of literature are William Watson, Hall Caine and Richard Le Gallienne.

Consult Howell's *Seven English Cities;* Shaw's *Municipal Government in Great Britain.*

LIVERPOOL, the county town of Queen's County, Nova Scotia, a port of entry at the mouth of Mersey River, on the Halifax & Southwestern Railway. It is 112 miles southwest of Halifax by rail but only eighty miles overland. In addition to an extensive trade in fish and lumber, the town is known for its tanneries, pulp mills and allied industries. Its harbor, directly on the Atlantic, is excellent. Population in 1911, 2,109; in 1916, about 2,300.

LIVERWORTS, *liv'ur wurts,* tiny plants closely resembling certain mosses. There are several hundred varieties known, and some member of the family is found in every part of the world. They grow in damp, shaded places, on rocks and the bark of trees, and sometimes in water. The liverwort is a flat, lobed, leaflike plant, somewhat resembling the human liver in shape. It was given its name because of this resemblance, and was once superstitiously supposed to be a cure for diseases of the liver. On the underside of the little flat leaf are many tiny rootlets which hold the liverwort to the object upon which it is growing.

LIVINGSTONE, *liv'ing stun,* DAVID (1813-1873), pioneer missionary and explorer, who made "Darkest Africa" known to the world, was born at Blantyre, Scotland. His parents were poor, and he went to work in a cotton factory at the age of ten. He struggled hard to educate himself and after having managed self-support through a course in medicine at Anderson College, Glasgow, he offered his services to the London Missionary Society. He was sent to Africa, although he had hoped to go to China, and commenced his missionary labors among the natives of Bechuanaland and the vast regions of Central Africa. He was a man of uncouth appearance, but had a captivating manner which everywhere made him friends. A man of great purity of thought, he exercised great influence on all with whom he came in contact.

DAVID LIVINGSTONE

His life in Africa was a continuous struggle. He devoted himself heart and soul to the civilization of the native tribes; he won the friendship of the chiefs and went fearlessly and safely where before no white man had penetrated. He won the confidence of the natives; even the brutal and debased Arab slave dealers paid him

respect as the "very great doctor." To Livingstone are due the steps afterwards taken by the British to end human slavery in Central Africa; he caused the whole world to cry out in condemnation of the atrocities he witnessed.

In 1849 Livingstone pushed far north of civilization, beyond the tropic of Capricorn, and made the important discovery of Lake Ngami. In 1852 he started on an expedition which brought him to the then little known Zambezi.

MAP OF LIVINGSTONE'S EXPEDITIONS

He explored the upper reaches and traveled westward, eventually coming to Loanda on the Atlantic coast. From Loanda he journeyed entirely across the continent to Quilimane at the mouth of the Zambezi on the eastern coast. This journey was a succession of almost unsurmountable difficulties, overcome by the indomitable courage of Livingstone, who was tortured and emaciated by fever. His left arm, torn and shattered by an attacking lion, caused him constant trouble; food was scarce, and his medicine chest was stolen, but still he pushed forward. He discovered the now famous Victoria Falls on the Zambezi, and followed the course of the river to the coast.

He was later appointed British consul at Quilimane and was placed in charge of a party to explore Eastern and Central Africa, discovering Lake Shirwa and Lake Nyassa. In 1866 he started with another expedition to discover the true source of the Nile. For nearly three years nothing was heard from him. Pressing on against great difficulties and worn by want and sickness, he discovered the Serapula River and lakes Moeru and Bangweolo. He arrived at Lake Tanganyika in 1869 and remained there some time before continuing his explorations. In 1871 he was at Nyangwe, on the Congo, but was not certain that the river was the Congo. Returning to Ujiji, on Lake Tanganyika, he was met by H. M. Stanley, who had been instructed by James Gordon Bennett of the New York *Herald* to "go and find Livingstone."

Another year of suffering proved more than his constitution could bear and he died in the village of a friendly chief on the shore of Lake Bangweolo. His devoted native servants buried his heart at the foot of the tree beneath whose branches the "great white doctor" passed away and carved a rough inscription on the tree. They then preserved the body and carried it reverently down to Zanzibar, where it was identified by the lion-torn left arm. The body was later taken to England and buried with great ceremony in Westminster Abbey, the final resting place of Britain's greatest men. He was the author of *Missionary Travels and Researches in South Africa* and *Narrative of an Expedition to the Zambezi and Its Tributaries.* His own works tell with the utmost simplicity and modesty of his accomplishments in the heart of the Dark Continent. F.ST.A.

Consult Stanley's *How I Found Livingstone.*

LIVONIA, the central of the three Baltic provinces which were Russian until 1918. Esthonia is north, and Courland southwest. In the seventeenth century Livonia belonged to Poland; in 1660 it became Swedish, and in 1721 Peter the Great annexed it to Russia. In the Bolsheviki peace with Germany in 1918 it became German. There are 1,480,000 people in Livonia; only 7½ per cent are German; 40 per cent are Esthonians. Riga is the great Livonian port.

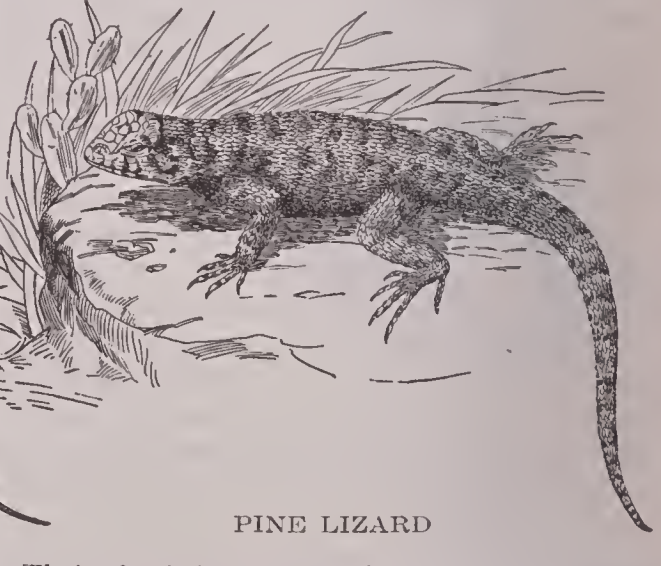
LIVRE, *le'ver,* an old French coin that differed in value according to the place of issue. The term was derived from the Latin *libra,* meaning *balance.* The standard livre was equal to four-fifths of the Paris livre, and its value compared with that of the franc was as the ratio of eighty to eighty-one; its equivalent in United States money is 19.3 cents. Under the first republic of France in 1795 the livre was superceded by the franc, which is now the unit of the monetary system of France and of the Latin Monetary Union, which comprises Greece, Italy, Belgium and Switzerland.

LIVY, *liv'i,* Titus Livius (59 B.C-A.D. 17), the most eminent of the Roman historians, was born at Padua, in the north of Italy. He belonged to a period filled with great writers, known as the Augustan Age. He was the son of wealthy parents and established himself in

Rome, where he enjoyed the patronage of the Emperor Augustus. His history of Rome was written partly in Rome and partly in Naples, and originally consisted of 142 books, but only thirty-five have been preserved. *The Annals of the Roman People,* as he called his great work, begins with the foundation of Rome and nds with the death of Drusus, the brother of Tiberius. Portions of Livy's writings are quite generally used in colleges as a standard course for advanced classes in Latin.

LIZ'ARD, a group of reptiles distributed throughout the temperate and tropical regions, and consisting of many species. They show wide differences in size, structure and habits. In general the lizard possesses a long body with a protruding head, a distinct neck, four sprawling limbs, and eyes provided with movable eyelids or a protecting fold of thin skin. In size it ranges from tiny, wormlike forms to those six or seven feet in length. The skin, like that of snakes, is usually covered with scales, but these are much reduced or otherwise modified in some species. Some forms have lost one or both pairs of limbs, but the legless lizards may be distinguished from snakes in that the latter are capable of opening the mouth to a greater extent than can the lizards.

KEELED LIZARD



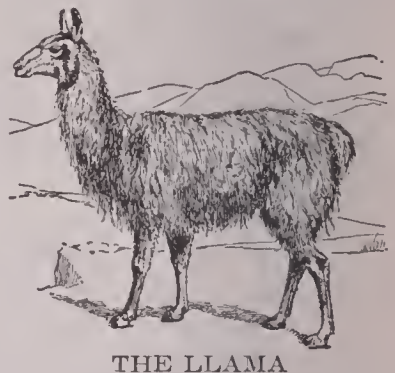
PINE LIZARD

Lizards are black, red, yellow and white, with combinations of gray and brown; some species, notably the chameleons, possess the power of changing their hue to correspond with the color of the objects on which they lie. Many of these reptiles possess the power of snapping off the tail when that organ is seized by a would-be captor. Then the mutilated creature seeks the crevice of a rock, where it waits patiently for a new tail to grow. Lizards feed mostly on worms and insects, but sometimes they eat vegetable foods. They reproduce usually by hatching eggs; in a few species the young are born alive.

Related Subjects. Reference is made to the following lizards in these volumes:

Chameleon	Horned Toad
Gecko	Iguana
Gila Monster	

LLAMA, *lah'ma,* an animal belonging to the camel family, although smaller than the camel and less stupid in appearance. It has no hump on the back; the feet are more pointed and are divided into two toes, each with a strong, horny nail or hoof, with a thick pad beneath adapted for traveling in the mountains. Llamas live only in the western parts of Central South America, where the climate is temperate; they are the principal beasts of burden of the Indians of Peru and Bolivia. They are found in the higher ranges of the Andes, twelve to sixteen thousand feet above sea level, seldom descending lower than 6,000 to 7,000 feet.



THE LLAMA

Their food is mosses, lichens, tough, grassy reeds, and such shrubs as grow in high latitudes. If they find juicy food they seldom require water. Their hair is long and woolly and of a pale, reddish color, which is valued highly by the Peruvians, who weave the fleece into cloth. When cornered, llamas cluster in groups, with tails together and heads out to meet the enemy. Their only weapon of defense is their saliva, which they squirt through their teeth in showers as a Chinese laundryman sprinkles clothes. A drop of this saliva on any

part of the body where the skin is broken produces a very dangerous sore, like the venom of a serpent. There are two wild species of the llama, the *vicuna* and the *guanaco;* and two domestic species, the *llama* and the *alpaca,* both probably derived from the guanaco. See VICUNA; ALPACA.

LLANOS, *lahn'ohz,* a name applied by the Spaniards to the vast treeless plains in Venezuela and Colombia, in South America. They extend inland from the delta of the Orinoco to the Yapura, a branch of the Amazon River, and have an area of about 300,000 square miles, or a larger territory than Texas or the province of Alberta. Heavy rains fall in the wet season, and the rivers flood the country; but after the water recedes rich grasses grow which provide food for herds of cattle and horses and flocks of sheep. Hot winds scorch the vegetation during the dry season, and the country becomes a desert; the animals then move where water can be found. The inhabitants of these plains are known as *llaners.* The plains farther south are called *pampas;* these are covered with a tall feathery grass, which, near the rivers, is green throughout the year. See PLAIN.

LLOYD GEORGE, DAVID. See GEORGE, DAVID LLOYD.

LLOYDS', *loids',* an insurance company of London, devoted primarily to marine insurance business. It is one of the greatest commercial organizations in the world, and is also known for its willingness to assume risks of unusual character. The firm, which was incorporated in 1871, originated about 1688 in the gatherings of a group of merchants who were accustomed to meet for business and sociability at Lloyd's Coffee House in Tower Street, London; from this famous coffee house the company took its name. The present headquarters consist of a merchant's room, library, restaurant and a room for the use of underwriters, in which auctions are also held. The association is made up of members and subscribers, and the government of the corporation is delegated to a committee. Subscribers pay an annual fee of about $25, but are permitted no voice in the management of affairs. Members are divided into two classes, underwriters and non-underwriters. Lloyd's receives daily reports of shipping in all parts of the world, which, with other information on that subject, are published every day. It also issues annually *Lloyd's Register of Shipping.*

While Lloyd's affairs are always handled for profit, they are conducted in accordance with good business methods. If a manufacturer in America or any other country wishes to insure his plant against fire for a large amount and his local insurance company for any reason cannot take the whole risk, it may ask a broker of Lloyd's to assume a certain part of it. When the broker receives this request, he turns it over to other brokers of the company, each representing a number of underwriters. Each representative designates how much of the total risk he is willing to assume, and when the whole sum has been subscribed the London company returns a *binder* to the local insurance agency. This binder means that Lloyd's covers the risk under the same conditions that the local company does, and while this does not actually insure the property, it confirms the judgment of the home agency. If the manufacturer's local insurance company withdraws its policy, that of the London agency is also withdrawn.

As an example of its unusual risks, such as no other company will consider, Lloyd's will insure a singer's voice, a dancer's foot, a pugilist's fists or the outcome of an election which promises to be very close; it once insured a valuable pear tree in California for $30,000 against fire and frost, and it is not unusual to insure a London merchant against loss of custom because of a storm on a special sale day.

LOADSTONE. See MAGNET AND MAGNETISM.

LOAM, *lome,* a soil compounded of sand and clay, sufficient sand being present to keep the clay from forming a solid mass. Carbonate of lime is usually present in small quantities, and the presence of decayed animal and vegetable matter, in the form of *humus,* adds greatly to the richness of the loam. All loam soils are suited to farming and gardening, those in which sand predominates being best for early crops. See SOIL.

LOB'BY AND LOB'BYING. A lobby is a spacious entrance way to an assembly hall or hall of legislation, conveniently used as a waiting room by those who have business to transact with officials. The term has also been applied for years to those persons who meet legislators for the purpose of influencing their votes on certain measures. "Lobbying" is the act of using persuasion and influence upon a lawmaker, either openly or in secret, to secure his support and vote. In national capitals and in every state and provincial capital during legislative sessions and in city council chambers are sometimes scores of men and women who

are the acknowledged salaried agents of interests that wish to see certain laws enacted or certain bills killed. Besides these are persons appearing on their own responsibility in behalf of or in opposition to certain proposed laws.

It is not proper to conclude that lobbyists are necessarily corrupt. It is the privilege of citizens in person or through representatives to advise lawmakers as to their desires. So long as logical argument and persuasion are the means employed the occupation of the lobbyist is legitimate; only when in secret conferences votes are won by immoral proposals, such as the use of money or barter of place and power, does the "lobby" become an evil institution. The very general objection to the "lobby" is that its acts are in great part secret, and that the public cannot know the relations that exist between a legislator and a seeker after favors. The use of money or other valuable thing to secure legislative favors constitutes the crime of bribery, and in every country severe punishment, which may include both imprisonment and fine, follows conviction. E.D.F.

Consult Bryce's *American Commonwealth;* Brooks's *Corruption in American Politics and Life.*

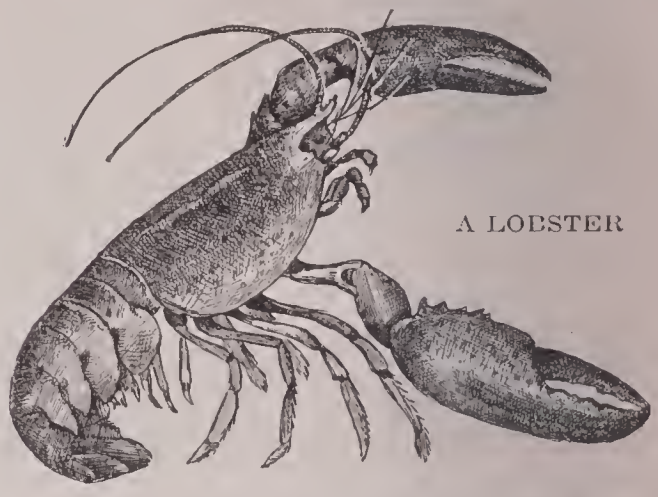
LOBELIA, *lo bē'li a,* a widely-distributed group of herbs, which contains 400 known species. They are native to tropical and temperate climates, but are found chiefly in damp woods, swamps and marshes of North America and the north of India. Many favorite garden flowers belong to this group, among them the cardinal and the blue cardinal, which blossom year after year in the warmer parts of North America. The red lobelia blooms from the last of July until September, when its bright blossoms are readily distinguished in meadows and low, wet places. The stem is straight, and grows to a height of two to four feet, terminating in a long spike of brilliant cardinal flowers.

LOBELIA

The *Indian tobacco,* another species, which has blue flowers and an erect stem a foot high, was employed by the Cherokee Indians for medicinal purposes. From the roots and tops of many lobelias a drug is procured which was once widely used as an emetic, but is now valued chiefly as a remedy for asthma. The group was named for Lobel, a botanist under King James I.

LOB'STER, a large, long-tailed shellfish, extensively used as a food delicacy in cities. The supply is decreasing, and the price has risen over 400 per cent since 1880.

The principal swimming organ is the tail, which by a sudden bending underneath sends the animal swiftly backwards. The body is



A LOBSTER

divided into seven distinct sections, besides the thorax and head. The lobster has six pairs of mouth organs and two pairs of antennae. The first pair of long legs terminate in large claws, one of which is very thick and strong, and is used for crushing its food; the smaller claw is used for fighting or to seize its victim. The eyes are placed at the end of movable stalks, or *peduncles.*

The lobster changes its shell to accommodate its growth. The new shell begins to grow under the old one; the latter splits in two near the head, but that covering the tail is shed without splitting, the body being drawn out through the joints. As the new shell is very soft, the animal is unprotected after shedding the old one and is obliged to hide in crevices in the rocks to escape from hungry fishes and its own species until its shell hardens. The shell of the lobster is dark green, with darker blotches, but turns bright red when boiled.

The female lobster lays thousands of eggs, which are glued together and attached to the underside of her body until they are hatched. The young resemble their parents, but lack the large claws. They swim near the surface of the water until they are about an inch long, and often take shelter under the mother's tail.

Copyright:
Underwood & Underwood

THE LOBSTER INDUSTRY.

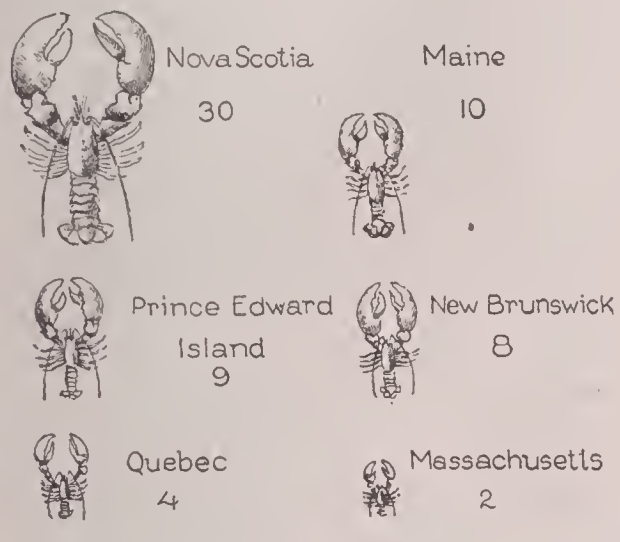
Above: A lobster pond on a level with high tide, on the Bay of Fundy. Below: A hatchery in France

Copyright:
Underwood & Underwood

SEED LOBSTERS. Each female begins laying eggs when eight inches in length, at the rate of 5,000 a year. When ten inches long, the number is doubled, and when a foot long her eggs may number 20,000.

After about a month they remain near the bottom, where they can retire to safety when danger threatens. The species common to Atlantic waters is found from New Jersey northward, the best being taken along the shores of New England north of Cape Cod. They usually measure from twelve to twenty-four inches in length and weigh from two to fifteen pounds, though some much larger specimens are occasionally caught.

Lobster Fishing. Lobsters are caught in large numbers in wooden traps, called *pots,* which are made of wood, fitted at each end with a funnel-shaped opening covered with netting, with a hole in the center. The lobster



THE LOBSTER CATCH EVERY YEAR

The above figures represent the number of pounds per year averaged for a period of five years. Elsewhere than along the shores of the provinces and states named the catch is not important. North Americans eat over 50,000,000 pounds of lobsters every year and send large quantities to Europe.

pots are baited with dead fish, or almost any garbage, and are sunk to the bottom in deep water among the rocks where the animals live, and the spot is marked by wooden floats. The lobster can enter the trap easily, but cannot find his way out again. Every day or two the pots are raised to the surface of the water and their contents emptied into large floating cars, where the catch is confined until wanted for market. A peg is driven into the "thumb" of each lobster to prevent the claws from opening; this treatment prevents them from fighting and destroying one another. They are very quarrelsome, and by nature attack each other so viciously that they often lose their claws. Twenty to thirty million lobsters are caught every year along the New England and Canadian coasts, and the fishery is a source of great profit. Lobsters are counted among the "scavengers of the sea," as they feed on decaying animal matter. They also eat fish, clams, mussels and other mollusca.

Consult Herrick's *Natural History of the American Lobster;* Mead's *Method of Lobster Culture.*

LOB'WORM, the name of a family of worms that burrow in the sands of the seashore along the coasts of Europe and North America. The lobworm is from eight to ten inches long, and is much used for bait in deep-sea fishing. Its habits are similar to those of the ordinary earthworm, but it belongs to a different order. It has no eyes; the head is large and is armed with a long nose, or proboscis. The worm breathes through thirteen pairs of minute, gaily-colored tufts, and there are bristles on the rings of the body. At low tide it may be easily traced on the beaches by the coils of sand it leaves when crawling along. It is also called *lugbait* and *lugworm.*

LOCAL OPTION means *local choice.* The term refers particularly to the right of any political division, such as a township, city or county, to determine for itself the conditions under which intoxicating liquors shall be sold, or whether the traffic in them shall be prohibited. To put this temperance weapon into the hands of the people an act of the legislature is required, granting authority to communities to determine the saloon question, according to local sentiment, and naming the smallest political district in which local option may be put into effect. Then the people within such district may by majority vote confirm the right of local liquor dealers to continue their business or force them to abandon it. As one of the means of regulation of saloons local option is becoming an increasingly important political issue. See PROHIBITION; TEMPERANCE; ALCOHOLIC DRINKS.

LOCHINVAR, *lock'in vahr,* a story-poem by Sir Walter Scott which has rejoiced the heart of countless children. It forms a part of *Marmion.* Scott was very fond of the old ballads, and this poem, with its simple style, its swinging meter and the refrainlike last lines of its stanzas, is patterned after them. It has, however, none of the quaint, old-fashioned touches which mark the old ballads, and which some poets have introduced even into their imitations. The story is simple. The gallant knight Lochinvar has been spurned by the father of the lovely Ellen, but appears at the wedding feast and under pretense of dancing with the bride

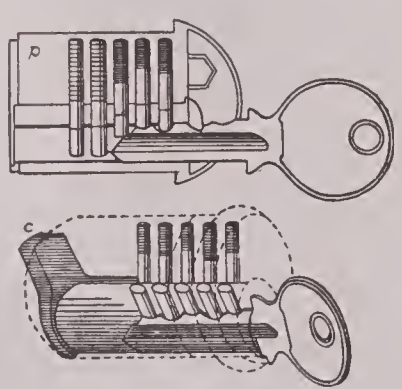
leads her to the door, lifts her on his horse and carries her away, all with her consent:

One touch to her hand, and one word in her ear,
When they reached the hall-door and the charger was near.
So light to the croupe the fair lady he swung.
So light to the saddle before her he sprung!
"She is won! we are gone, over bank, bush and scaur!
They'll have fleet steeds that follow!" quoth young Lochinvar.

LOCK, a fastening opened with a key or by mechanism easily kept secret, is a device as old as history, for the most successful modern door lock is a development of an old Egyptian device. It is almost impossible to open a good modern night latch without the proper key, and a time lock cannot be opened dishonestly even by those who know its exact construction.

When the key in an ordinary door or drawer lock is turned, the cuts in the former pass over *wards,* which are projections on the inside of the lock which will stop any key not having the same cuts. But by cutting away most of a key-blade, a *skeleton key* can be made which will open nearly any common lock.

Yale Lock. In 1860 Linus Yale, Jr., invented a lock now widely used, which cannot be opened with a skeleton. It is a cylinder within a cylinder. In the diagram, to turn the cam (*c*) which draws the bolt, the inner cylinder must be revolved. When the key is not in the lock the little pins (*p*), pressed down by the springs above them, hold the inner cylinder fast. Each pin is in two pieces, and the division is at a different height in each; when the proper key is inserted the pins are raised, so their divisions are exactly level with the division between the inner and outer cylinders. If a key differs 1/50 of an inch from the true key beneath any one of the pins, the cylinder cannot be turned.



MECHANISM OF A MODERN LOCK
Explanation of the figure is given in the article.

Combination and Time Locks. Because any lock having a keyhole can be picked by an expert, *combination* locks are used on safes. These are opened by a knob which must be turned back and forth certain distances known only to the proper persons. But as the combination can be learned by others, or may be stolen, *time locks* have been devised which cannot be opened even by their owners except at certain hours. In spite of the obvious advantages of time locks, they are little used outside of the United States and Canada.

LOCK, in canal construction. See CANAL.

LOCKE, *lock,* DAVID ROSS (1833-1888), an American humorist and satirist, born in New York City, better known by his pen name, PETROLEUM VESUVIUS NASBY. He first attracted attention through his "Nasby" letters, printed in the Findlay (O.) *Jeffersonian* in 1860, and later in the Toledo *Blade.* These epistles, which were supposed to be written by an unlettered man who regarded whisky and slavery with equal affection, were influential in molding popular opinion, since they upheld the policy of the Lincoln administration throughout the war. His book *The Struggles—Social, Financial and Political—of P. V. Nasby* contains the best of his humorous works.

LOCKE, JOHN (1632-1704), sometimes styled the "intellectual ruler of the eighteenth century," was one of the most influential of English philosophers. He was a native of Wrington, in Somersetshire, and was educated at Westminster School and Christ Church College, Oxford. After his graduation he took up the study of medicine. Under the patronage of the Earl of Shaftesbury, whose physician he became in 1666, he held various public offices, and in 1683 followed the earl to Holland, whither the latter had fled to escape arrest on the charge of high treason. In 1689 he returned to England and in the following year published his epoch-making work, *Essay Concerning Human Understanding.*

In setting forth his system of philosophy, Locke undertook to answer the question, How do we come by our knowledge, and what are its limits? He was the first to speak of the "association of ideas," and took the stand that whatever any man can know, or reasonably believe in, or even conceive, is dependent upon human experience. He maintained that at birth the mind is as a tablet of blank paper whereon Experience is to write ideas. We may have ideas without having knowledge, but we cannot have knowledge, or even opinion, without having ideas, for "having ideas" means "speaking intelligibly." He believed education should have as its aim the development of "a sound mind in a sound body." These and other inquiries into the nature and limits of human thought processes and education are

embodied in his famous *Essay,* and his *Thoughts Concerning Education.*

Locke was influential as a moralist, an economist and as the leader of many public reforms, but he stands preëminent as a defender of individual freedom—religious, political and intellectual. This idea dominates all his writings, whether he chose the subject of *Civil Government,* or the *Reasonableness of Christianity.*

LOCK HAVEN, PA., the county seat of Clinton County, is a manufacturing city with a population of 7,772 in 1910. It is situated north of the geographical center of the state, on the West Branch of the Susquehanna River, at the point where it receives the waters of Bald Eagle Creek. Williamsport is twenty-five miles northeast, Philadelphia is 223 miles southeast and Erie is 223 miles northwest. The city is served by the Philadelphia & Erie, Bald Eagle Valley and the New York Central railways. The first settlement was made in 1833 by Jerry Church, of New England; it was incorporated as a borough in 1844 and as a city in 1876. In 1913 it adopted the commission form of government. Here was located the "lock" of the old West Branch Canal which afforded a "haven" to traffic down the river, hence the name of the city.

The principal manufactories are dependent on the resources of the surrounding country, which is a rich agricultural and lumber region; it also has fine deposits of hard and soft fire clay and red shale for making bricks. Bituminous coal beds, too, are found in the vicinity. Lumber and planing mills, fire-brick works, sewer-pipe plants, silk mills, paper mills, cigar and cigar-box factories, and tanneries are among the industrial establishments of the city. The Central State Normal School, with several fine buildings, is located here. The city also has a business college, a library, parochial and public schools, the $100,000 high school built in 1914 being one of the notable buildings. C.M.E.

LOCK'JAW, or **TETANUS,** *tet'a nus,* a serious disease characterized by continuous rigidity of the muscles, which closes the jaws and holds the spine curved backward. It is caused by a germ (*tetanus bacillus*) which lives in earth or dust, especially around stables, gardens, in the dust of streets or houses, in manure and in splinters. These germs are often present in gunshot wounds. The disease is twenty times more frequent in the tropics than in temperate regions, and may select certain localities or districts. It gains entrance to the body through wounds, varying in size from a needle-prick to an operation wound. Rusty nails, as such, never produce lockjaw; but the germ of lockjaw, or tetanus, which is often found in earth, may be held in the rough places of the rusty nail, and this germ may infect the wound made by the nail, may enter the blood, and the poison which it manufactures may produce the symptoms of lockjaw. A clean rusty nail cannot infect.

Symptoms show themselves any time from six hours to nine days after infection, and begin suddenly with stiffness of the muscles of the lower jaw and neck. The teeth are set, the eyes are glaring and nostrils dilated; the upper lip is drawn up and back; the lower lip is projected down, giving a sardonic grin to the mouth. The muscles of the back and neck are drawn tightly, arching the body backward, the weight resting on the head and heels. There is high fever, violent muscular pain and inability to swallow or to talk, but the senses are clear until death, which occurs in ninety per cent of cases.

Treatment. Wherever there is any suspicion of tetanus poisoning use 1,500 units tetanus antitoxin as soon after the injury occurs as possible and keep the wound open by swabbing with zinc, iodine or carbolic acid, applying alcohol after one minute. Nerve-quieting medicines should be taken when needed. No person infected should attempt personal treatment, however, for even a skilled physician's powers are taxed to save the patient. C.B.B.

Consult Osler's *Modern Medicine.*

LOCK'PORT, N. Y., the county seat of Niagara County, situated in the center of the Niagara fruit belt, in the western part of the state, twenty-six miles north by east of Buffalo. It is on the New York State Barge Canal (which see) and on the Erie and the New York Central railroads. The population, which in 1910 was 17,970, was 19,879 (Federal estimate) in 1916. Lockport covers an area of eight square miles, and is partly built in terraces along the sides of "Mountain Ridge." The chief points of interest are the two great locks by which the canal descends sixty feet from the level of Lake Erie to the Genesee level, and the New York Central Railroad bridge, one of the widest bridges in the world, which crosses the canal in the heart of the city.

Among the prominent buildings are the Federal building, courthouse, public library, Y. M. C. A. building, city hospital, Odd Fellows' Home and the county jail and almshouse.

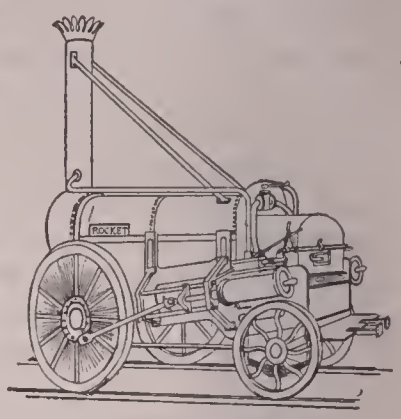
There are four parks, and extending from the town throughout the country are excellent roads. The city has a large trade in grain and fruit, quarries of Niagara limestone and sandstone, pulp-paper and fiber mills and manufactories of automobile supplies, milling and woodworking machinery, cotton and woolen batting, aluminum, glass, flour, brooms, wall board and textiles.

When the Erie Canal was opened in 1825 a settlement was made on the site of the present city. This was incorporated as a village in 1829 and became a city in 1865.

LOCK'WOOD, Belva Ann Bennett (1830-1917), an American reformer, lawyer and lecturer, and the only woman ever nominated for President of the United States, was born at Royalton, N. Y. In 1848 she was married to U. H. McCall, who died after five years, and in 1868 to Dr. Ezekiel Lockwood, who died in 1877. After teaching school for eleven years and graduating from Genesee College, Lima, N. Y., during that period, she took up the study of law, and in 1873 was admitted to practice in the District of Columbia. She was later admitted to practice before the Supreme Court of the United States, under a law admitting women which she was instrumental in inducing Congress to pass. Her activity in the causes of woman suffrage and temperance brought about her nomination for the Presidency in 1884 and again in 1888, by the Equal Rights party. She was a delegate to the International Peace Congress in 1908, and she lectured frequently on the reforms which she advocated. In 1913 she was a delegate to the Women's World Convention in Budapest, Hungary, and in the same year was elected a member of the International Peace Bureau at Brussels.

LO'CO-FO'CO, a nickname in American politics, first applied in 1835 to the radical faction of the Democratic party in New York state. In October of that year a meeting of New York Democrats was held in Tammany Hall for the purpose of effecting an organization opposed to the chartering of state and private banks by special legislation. The conservative element attempted to prevent this action, but, finding themselves outnumbered, turned out the lights and left the hall. Not to be outdone, the reform faction lighted candles with "loco-foco," or friction, matches, reorganized the meeting and proceeded with their business. These reform Democrats were at once called *loco-focos* by the Democratic press, and in course of time the Whigs applied the term to the Democratic party as a whole. The original loco-foco Democrats later took the name of Equal Rights party (see Political Parties in the United States).

LOCOMOTIVE, *lo ko mo' tiv,* a machine driven by steam or electricity, used for moving cars upon a track. The word is formed by the union of two Latin words, *locus,* meaning *place,* and *motivus,* meaning *moving;* so in its broadest sense, a locomotive is any self-propelling vehicle.



THE "ROCKET"
The first Stephenson locomotive.

The first steam locomotive to run on rails was designed in 1803 by Richard Trevithick, a Welsh engineer. It was followed ten years later by *Puffing Billy,* which got its expressive name from the noise it made in hauling cars. The locomotive of the present, however, was developed in large part by the genius of an English engineer, George Stephenson, who won a prize of $2,500 offered by the Liverpool & Manchester Railway in 1829, by entering his *Rocket* in competition with other designs. The *Rocket,* though it looks crude to twentieth-century people, contained all the essential parts of a locomotive; moreover, it attained a speed of almost thirty miles an hour. It only remained for later engineers to develop still further the speed and hauling power of the Stephenson design. See Stephenson, George.

Structure. A steam locomotive consists of a frame, the boiler and engines supported by it, and a running gear on which it travels. The boiler is a long cylindrical body of steel, having a furnace at one end and a smoke box at the other. Smoke and gas from the furnace are carried to the smoke box at the front through numerous tubes, called flues, about two inches in diameter. These tubes, as well as the fire box, are surrounded by water, so that as much heat as possible may be absorbed. The smoke box is supplied with a netting to catch the large cinders and hot sparks, which might otherwise set fire to houses and dry grass along the right of way. The water in the boiler is heated and turned into steam.

The engine converts the pressure of the steam in the boiler into the force that rotates the drivewheels. It consists of cylinders in

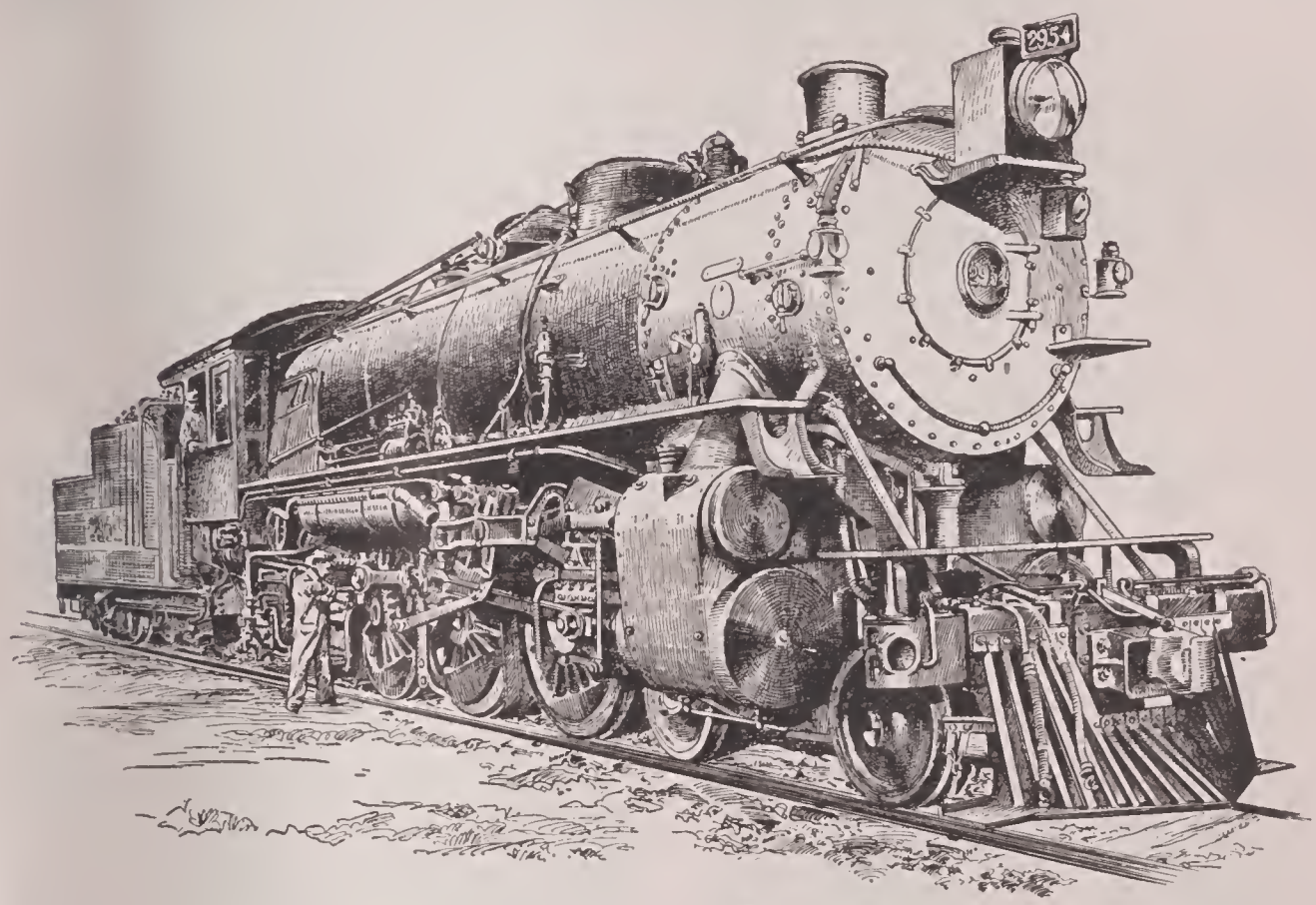
FIRST BUILT IN THE BRAIN OF MAN.

Above is the largest locomotive in the world. It weighs 816,000 lbs. Owned by the "Santa Fe" Railroad for mountain work. Below, Chesapeake & Ohio mountain type passenger engine, weighing 494,400 lbs.

which the pistons slide, and rods connecting the piston with the wheels. The cylinders are carried on either side of the engine, near the front. Steam is admitted to them by means of a throttle valve carried in one of the domes on the top of the boiler and operated by means of a lever in the cab. The piston rod slides through a round hole in the back cylinder head, which is packed so as to be steam-tight. Through this rod, power is conveyed to the main driving wheels, and by means of connecting side rods to the other driving wheels.

Types of Steam Locomotives. The two main types of locomotives are those developed by the different needs of passenger and freight service.

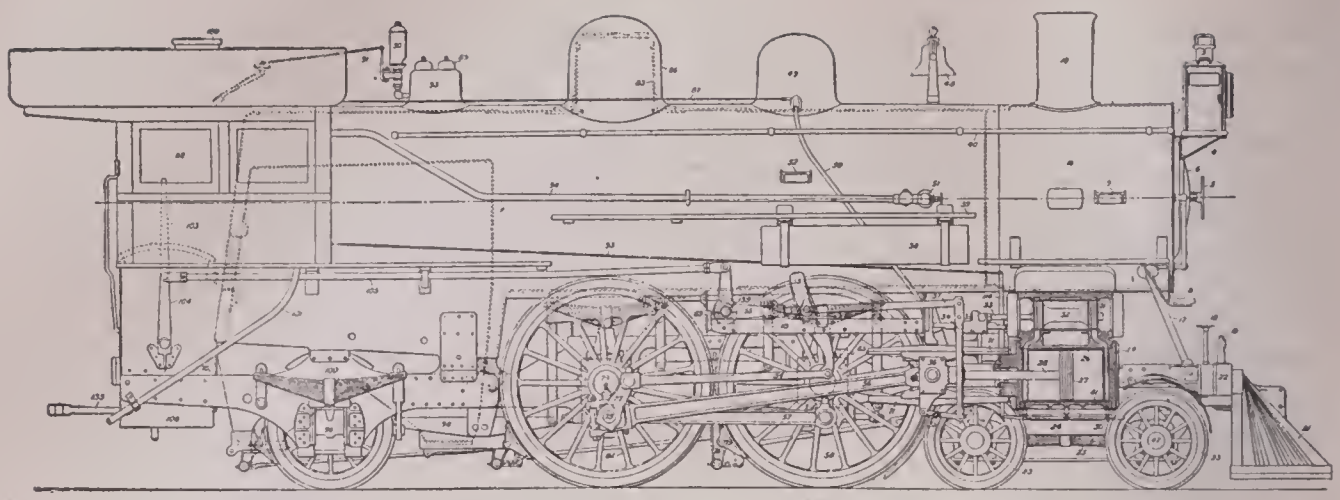
Passenger Service. Passenger service may be divided into through service and local service. For through service, powerful locomotives of great speed are built to haul from six to fifteen coaches long distances. They are capable of maintaining a speed of seventy-five or eighty miles an hour. Many of them are now constructed with twelve wheels—three pairs of driving wheels, two trailing wheels under the cab, and four small wheels for guiding purposes. The guiding wheels are attached to the leading truck. The driving wheels on locomotives of which speed is required are much larger than those on freight locomotives, so the train may be carried forward farther with each revolution. On locomotives of the so-called Atlantic type and Pacific type, the driving wheels are occasionally eighty inches in diameter. Such locomotives may weigh as much as 425,000 pounds. For local service, locomotives having much smaller drivewheels and steam capacity are used.

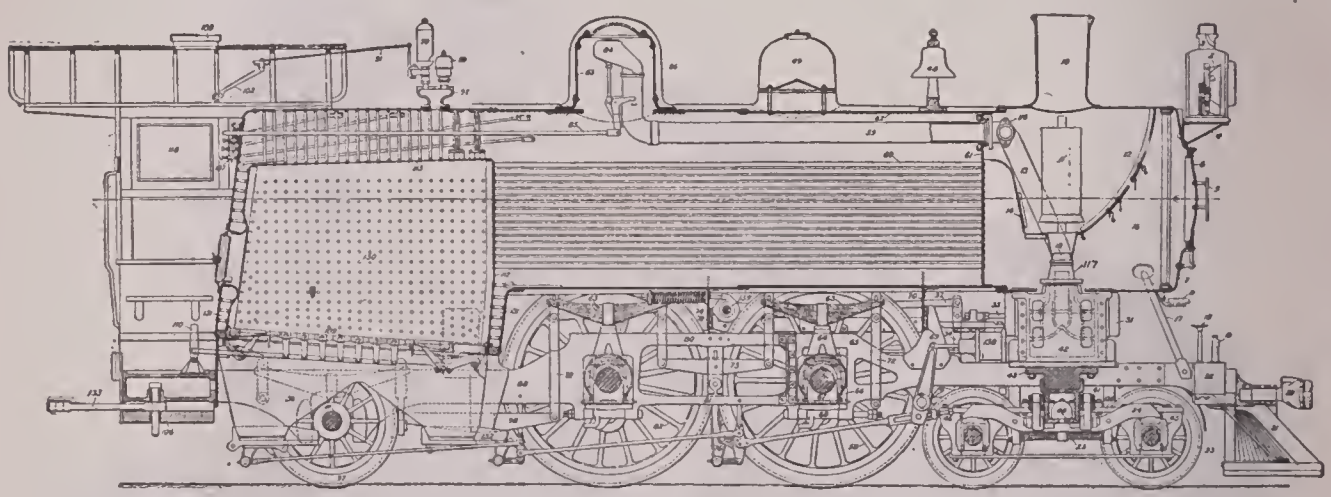


A MODERN LOCOMOTIVE

The illustration is that of a locomotive over seventy-five feet long, which weighs 212½ tons. A man six feet tall and wearing a silk hat can stand erect in the smaller end of the boiler. A barrel could be placed within one of the cylinders. Fewer than ninety years of development lie between the above monster and the "Rocket" of 1829.

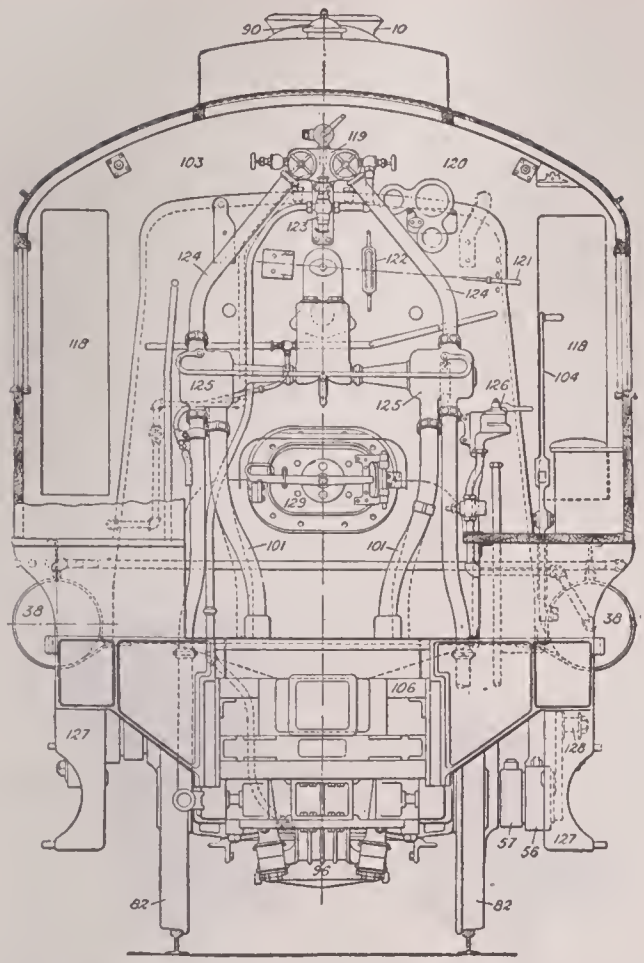
The working parts of the engine are connected by levers with the cab. These are, besides the *throttle valve* already mentioned, the *reversing mechanism;* the *air brakes,* which control the brakes of the entire train; the *injectors,* which admit water from the tender to the boiler; the *sanding device,* which occupies another dome on the engine and conveys sand to the track to prevent the wheels from slipping; the *whistle* and the *bell.* The engine is often oiled, too, by means of automatic lubricators operated from the cab. These lubricators provide a continuous flow of oil to parts of the machine where the friction is great.





NAMES OF THE PARTS OF A LOCOMOTIVE

1. Headlight case
2. Headlight reflector
3. Headlight ventilator
4. Headlight bracket
5. Number plate
6. Boiler front door
7. Boiler front
8. Headlight step
9. Smoke box step
10. Smokestack
11. Petticoat pipe
12. Netting
13. Steam pipe
14. Diaphragm
15. Exhaust nozzle
16. Smoke box
17. Front boiler brace
18. Front bumper step
19. Flagstaff base
20. Coupler
21. Pilot
22. Front bumper
23. Front truck wheel
24. Front truck equalizer
25. Front truck spring
26. Cylinder bushing
27. Piston
28. Piston rod
29. Front cylinder head
30. Cylinder cock
31. Steam chest
32. Valve
33. Valve stem
34. Lap and lead lever
35. Lap and lead lever connector
36. Crosshead
37. Radius rod
38. Main air reservoir
39. Running board
40. Handrail
41. Cylinder
42. Saddle
43. Saddle center plate
44. Engine truck center plate
45. Engine truck axle box
46. Engine truck pedestal
47. Engine truck axle
48. Bell
49. Sand box
50. Sand pipe
51. Injector check
52. Sand box step
53. Link
54. Eccentric rod
55. Lifting arm
56. Lifting arm
57. Side rod
58. Front or trailing driving wheel
59. Dry pipe
60. Tube
61. Front tube sheet
62. Boiler shell
63. Driver spring
64. Driver spring saddle
65. Engine frame
66. Driving box
67. Driving box cellar
68. Pedestal binder
69. Frame brace
70. Boiler brace
71. Guide
72. Drive spring hanger
73. Driver equalizer
74. Lifting shaft compensating spring
75. Driver brake shoe
76. Driver brake lever
77. Eccentric crank
78. Main crank pin
79. Driving axle
80. Top-rail of frame
81. Bottom-rail of frame.
82. Main driving wheel
83. Steam dome
84. Throttle box
85. Throttle rod
86. Dome casing
87. Sand rod
88. Back frame
89. Safety valve
90. Whistle
91. Whistle rod
92. Safety valve dome
93. Safety valve dome casing
94. Injector delivery pipe
95. Cylinder cock rod
96. Ash pan
97. Trailing truck wheel
98. Trailing truck equalizer
99. Trailing truck axle box
100. Trailing truck spring
101. Injector suction pipe
102. Whistle lever
103. Cab
104. Reverse lever
105. Reach rod
106. Deck plate
107. Gauge cock
108. Cab ventilator
109. Grates
110. Grate shaker lever
111. Trailing truck axle
112. Back tube sheet
113. Crown sheet
114. Cylinder cock lever
115. Link bracket
116. Tee head
117. Exhaust pipe
118. Cab window
119. Turret head
120. Gauge bracket
121. Throttle lever
122. Water gauge glass
123. Reducing valve
124. Injector steam pipe
125. Injector
126. Engineer's valve for air brake
127. Engine step
128. Tailpiece
129. Fire door
130. Fire box
131. Water leg
132. Ash pan slide
133. Drawbar
134. Drawbar pin
135. Safety bars
136. Truck frame
137. Saddle flange
138. Driver brake cylinder
139. Lifting shaft
140. Trailing truck frame
141. Tailpiece



Freight Service. Great hauling power is needed in the freight service; accordingly the boilers of locomotives are large and the wheels relatively small. The Mallet articulated compound locomotive, which came into use in 1904, is essentially two locomotives, the rear end of one being attached to the forward end of the other. Some of these long locomotives are made with a joint, so they may bend in going round a curve. The most powerful locomotive ever built was turned out of the Baldwin Locomotive Works in 1914. It weighs 853,000 pounds and hauled a train of 251 loaded freight cars as a test. Modern freight engines cost $18,000 to $20,000 each; their life is about thirty years. See STEAM ENGINE; RAILROAD.

The Electric Locomotive. Of late years the electric locomotive has become a serious rival of the steam locomotive. It has certain points of marked superiority. It usually develops more hauling power in proportion to its weight. It does not "freeze up" in cold weather, like the steam boiler; it requires no coal, and in a mountainous country it creates a great saving by "regenerating" on slopes much of the power it has expended on steep grades. In cities like New York, where steam locomotives are not permitted on Manhattan Island, the smoke nuisance is greatly lessened.

Structure. The electric locomotive does not in the least resemble a steam locomotive; it looks from the interior more like an ordinary express car. The striking thing about such a locomotive is its simplicity of structure; it consists of a frame carrying one or more motors, geared to the driving axles, and a number of switches to regulate the power. It collects power either from a wire overhead or from a number of sliding "shoes" passing along a third rail, electrically charged.

The motors are driven by dynamos in a central power house. A motor is itself a kind of dynamo. For an explanation of how the dynamo converts mechanical energy into electrical energy and of how the motor converts electrical energy into the power to do work, see the articles DYNAMO; ELECTRIC MOTOR. The force is imparted to the driving wheels in one of several ways. In one type of locomotives, the revolving armature shaft carries cogwheels, which fit into toothed wheels connecting with the axles of the driving wheels. In another type, the rotating armatures impart a similar motion to the driving wheels by an arrangement of cranks and connecting rods like those seen in the steam locomotive. Motors of this type recently installed by the Pennsylvania Railroad weigh 45,000 pounds each.

Efficiency. The electric locomotives used by the New York Central Railroad are fifty-seven feet long and weigh 110 tons. They are driven by eight motors, each of 325 horse power. Locomotives of the type used by the New York, New Haven & Hartford Railroad have eight motors of 170 horse power each. They are capable of pulling a heavy train at the rate of sixty miles an hour.

The largest electric locomotives ever built were designed for the Chicago, Milwaukee & St. Paul Railway. They were constructed to haul freight and passenger trains through the mountainous regions of Montana and Idaho, where the extreme elevation is 6,300 feet. These engines weigh 260 tons each and are 112 feet 8 inches long. They have a pull of 3,440 horse power and were designed to supplant the huge Mallet engines in use up to 1915. See ELECTRIC RAILWAY.

Consult Sinclair's *Development of the Locomotive Engine;* Kirkman's *The Locomotive;* Prothero's *Railways of the World.*

LOCOMOTOR ATAXIA, *lo ko mo' tor a tak' si a,* a disease of the spinal cord, characterized by a staggering gait, in which the lower limbs do not seem to be under control. It occurs usu-

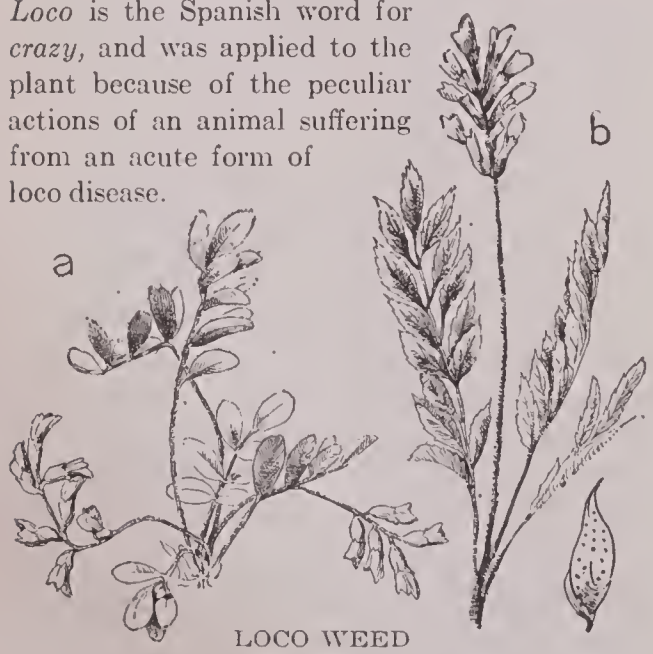
ally in men between the ages of thirty and fifty; the cause is not definitely known, but the most frequent provocative disease is syphilis. Many authorities believe this to be the sole cause. The malady may be from six to twenty years in developing.

The characteristic walk, in which the legs appear to be independent of their owner's will, the occurrence of a feeling of constriction about the waist (girdle sensation), and the gradual failure of sight may all be symptomatic of this disease; severe pains in the abdomen, occurring at irregular intervals and independent of any known cause, and called "gastric crises," may be present. Finally, if the suspect complains of "walking on cotton," a peculiar feeling in the soles of the feet, it may be accepted as evidence of locomotor ataxia.

No case has been known to recover, but treatment from the hands of a nerve specialist may arrest the disease. The patient may live for many years. It is highly important that the muscles be retrained and controlled when the patient is learning to walk again, and systematic exercises carried out under the instruction of a reliable physician have often accomplished very satisfactory results. W.A.E.

Consult Osler's *Practice of Medicine.*

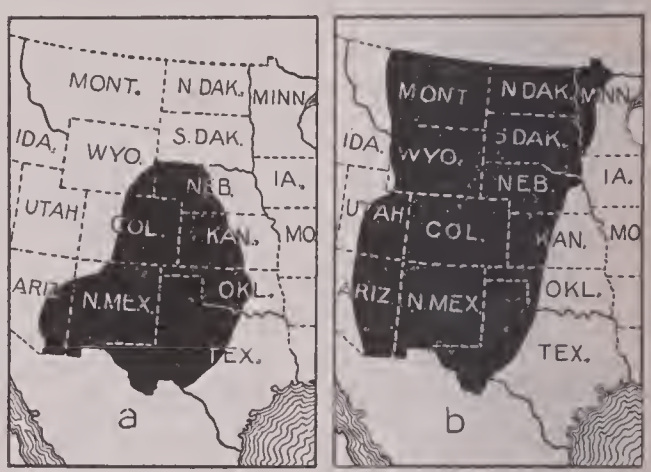
LOCO, *lo'ko,* **WEED,** a weed of the pea family, widely distributed over the grazing regions of the Rocky Mountains district, and greatly dreaded by Western stockmen because of its harmful effect on horses, cattle and sheep. *Loco* is the Spanish word for *crazy,* and was applied to the plant because of the peculiar actions of an animal suffering from an acute form of loco disease.



LOCO WEED
(*a*) White; (*b*) purple.

Symptoms of the Disease. Locoed horses show irregularities of gait, such as dragging the feet, and are unable to control and direct properly the action of the muscles. In going across a rut in a road a diseased horse may leap as if jumping over a ditch, or it may lift its feet very high in stepping over a low obstruction. A horse suffering from an acute form of the disease does not notice an approaching person until the latter is within a few feet, and it may then suddenly rear and fall over backwards. It is exceedingly dangerous to drive a badly locoed horse, because of its tendency to shy violently at imaginary objects. In the last stages of the disease the animal ceases to eat, and dies finally of exhaustion and starvation.

Locoed cattle also show a lack of muscular coördination. Sometimes a diseased steer will



DISTRIBUTION OF LOCO WEED
(*a*) Purple; (*b*) white.

rush about in a frantic manner and run wildly into obstructions, but usually these animals are dull and stupid. Violent shaking of the head, loss of flesh, staring eyes and rough coats are accompaniments of the disease, and in the end the animals die of starvation. Locoed sheep suffer from great weakness, as they often stumble and fall and can get up again only with difficulty. In general their symptoms are less marked than those of cattle and horses.

Though the United States Department of Agriculture has been investigating the subject since 1873, no specific medical cure for the loco-weed disease has as yet been found. Suggestions for treatment, however, are given in *Farmers' Bulletin Number 380,* issued by the Agricultural Department, Washington, D. C. This pamphlet may be secured by applying to that department.

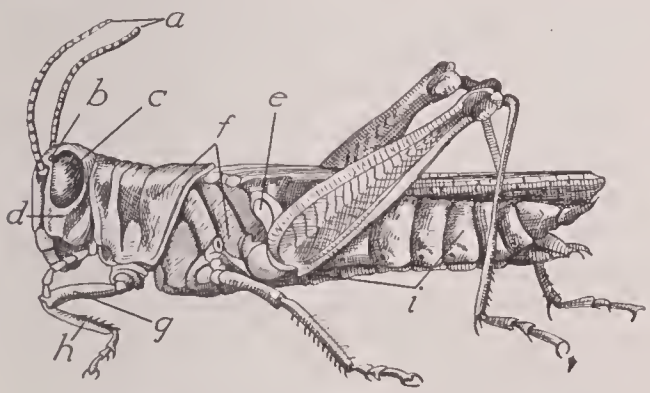
Varieties of the Weed. The loco disease is caused by the *purple* and *white* varieties of the loco weed. The former is the more poisonous, but is eaten only by horses; the latter is liked by horses, cattle and sheep, and poisons all of them. The purple variety is a perennial found

growing in patches on adobe soil, and attains a height of one foot. It bears deep purple flowers, short black, thick pods and leaflets thickly covered with hairs. The branches tend to lie rather close to the ground, giving the plant a sprawling appearance. Its blossoms appear about June 1 in the latitude of Colorado, but farther south the flowering season begins early in April.

The white loco is sometimes called the *stemless loco,* because it has no true plant stem. Its blossoms are borne on long flower stems that grow in a more or less upright position. In the regions of the Great Plains the plant bears white flowers, but in the mountains deep shades of violet and purple are common. This loco weed is of wide distribution (see map).

Consult "The Loco-Weed Disease," in *Farmers' Bulletin 380,* of the United States Department of Agriculture.

LOCUST, *lo'kust,* an insect known since remote antiquity for its crop-destroying habits. It belongs to the same family as the grasshopper—in fact, most of the American locusts would in England be considered grasshoppers.



PRINCIPAL PARTS OF A LOCUST

(*a*) Antennae	(*e*) Ear
(*b*) Ocellus (little eye)	(*f*) Thorax
(*c*) Compound eye	(*g*) Femur
(*d*) Head	(*h*) Tibia
	(*i*) Abdomen

The *seventeen-year cicada* (see CICADA) and other *cicadas* are often, though incorrectly, called locusts. (See article INSECT, subhead *Classification of Insects,* division 15.)

The locust plague in ancient Egypt is described in *Exodus* X so vividly that we know it to be the same as the one of modern times. The insects travel in swarms, settling down upon fields and systematically eating every stalk and leaf. One such swarm at the Red Sea was estimated to carpet an area of 2,000 miles. In the Mississippi Valley millions of dollars worth of crops were destroyed between 1870 and 1880 by the Rocky Mountain locust, but this region has suffered no serious invasion since 1876. On a summer morning in that year anxious farmers saw, like a thin, silvery cloud between them and the sun, countless millions of these dreaded creatures, whose fluttering, membranous wings had the appearance of an ever-shifting haze. Then they descended upon the growing fields of grain, and the season's crop was destroyed in a few hours. It is said that sometimes the locusts have appeared in such dense swarms they have impeded the movements of railway trains and obscured the brightness of the sun. As the main breeding grounds of the locust in Western United States are now in subjection to the plow, British Columbia is its principal North American home.

Several measures have been found useful in combating them. The eggs may be destroyed by harrowing and late fall plowing, and the newly-hatched young can be crushed between rollers. Some farmers scatter little pellets of bran and arsenic over the infested fields. The insects will eat this mixture, which is poisonous to them. The locust lays its eggs in the ground, enclosed in a case holding usually about twenty-five. In Cyprus, in the year 1881, over 1,300 tons of the little eggs were destroyed, but the next year there appeared to be as many of the insects as ever. Swarms have been known to travel from Saskatchewan to Texas, and others have been seen at sea 1,200 miles from land.

By drawing their hind legs across their wing covers, or when in flight by rubbing together their front and hind wings, swarms of locusts make a noise which is said to be deafening. In some countries locusts are eaten. Shakespeare, in *Othello,* speaks of food "luscious as locusts," and Saint Matthew says of John the Baptist that "his meat was locusts and wild honey." They are candied in China, and are an important article of the Filipino diet. Like the grasshopper, the locust has long hind legs with which it leaps, but its antennae (which see) are shorter than the grasshopper's. It differs from most insects in not passing through the usual stages of development (metamorphosis), the young *nymphs* being distinguished from the mature locusts chiefly by their lack of wings. C.H.H.

LOCUST, the name of a group of ornamental shade trees, nearly all of them thorny. They bear heavily-scented flowers, which hang in drooping clusters, those of most varieties resembling pea blossoms. The light blue-green leaves are compound, consisting of oval leaflets growing in single or double rows on opposite sides of a common long stem. The larger branches grow almost at right angles to the

trunk, but the little, sharp twigs grow in all directions. The trees grow rapidly and spread by means of suckers springing from the roots, as well as from the scattered seeds. They bear much trimming and make a fine, close hedge. The wood is very hard, made so by mineral crystals deposited in the cells by the growing tree, and is a valuable material for building ships and making furniture, cogwheels, wagon hubs and spokes.

LOCUST
Branch, showing form of leaves and seed pods.

The locusts belong to the pea family, and are found in Europe, Asia, Africa, America and the West Indies. The best-known American varieties are the *honey locust*, the *yellow locust* and the *clammy locust*. The first is the largest, the second the most common and the last is a garden shrub or small tree cultivated for its beautiful pink, fragrant flowers.

LODGE, Henry Cabot (1850-), an American statesman and historian of marked ability, was born in Boston. He was graduated from Harvard in 1871, and for his thesis on *The Land Law of the Anglo-Saxons* received the degree of Ph. D. He studied law, and was admitted to the bar in 1876. From 1873 to 1876 he edited the *North American Review,* and for the following three years was university lecturer on American history at Harvard. He was elected a member of Congress from Massachusetts in 1887; after serving three terms in the House he was elected United States Senator in 1899, and was reëlected in 1905, 1911 and 1917. Senator Lodge is one of the most scholarly men who have served in Congress in the entire history of the nation. His published works include *Life and Letters of George Cabot, Life of Washington, Certain Accepted Heroes and Other Essays* and *Story of the Revolution.* He also edited the *Complete Works of Alexander Hamilton* and wrote a biography of Daniel Webster.

LODZ, *lawdz,* in Russian, *looj,* is a manufacturing town of Russian Poland, capital of the district of Lodz, situated eighty-seven miles southwest of Warsaw. Until the early part of the nineteenth century Lodz was only a small village in an almost impenetrable forest, but German enterprise introduced the textile industry and the village grew into a city with Americanlike rapidity. Now it is the second city of importance in Russian Poland, and because of the great amount of cotton, woolen and mixed goods manufactured, is called the *Manchester of Poland.* There are, in addition, chemical factories, boiler shops and silk- and linen-weaving mills. Lodz is a typical industrial city, without boulevards or exclusive residence districts. Its one main street is seven miles in length. The population is made up chiefly of Poles, Jews and Germans, and there are few Russians of unmixed blood. In 1914, during the War of the Nations, Lodz was occupied by the Germans. The Russians recovered it, but one month later lost it to the Germans a second time; the latter strongly fortified the palace and used it as a base for their drives against Warsaw. Population, 1910, 415,600.

LOEB, *lohb,* Jacques (1859-), an American biologist and physiologist whose studies in the origin of life have attracted wide attention. He was born in Germany and studied at Berlin, Munich and Strassburg, taking the medical degree in the latter city in 1884. He taught in the universities of Würzburg and Strassburg, engaged in physiological research at the Naples Zoölogical station, and in 1891 moved to the United States, where he became associate professor of biology at Bryn Mawr College. From 1892 to 1902 he was professor of physiology and experimental biology at the University of Chicago, and in the latter year was elected to the chair of physiology at the University of California. In 1910 he was made head of the department of experimental biology at the Rockefeller Institute for Medical Research.

Loeb's work in the field of comparative physiology and psychology has been of the utmost importance, and particularly by his researches into the physiology of protoplasm has he won distinction. The effects of light and of salt solutions on heart action, cells and tissue have been most interestingly shown by him. Working with the lower forms of animal life, such as sea urchins, he has demonstrated that it is possible to fertilize the female egg by artificial means. Using ultra-violet rays (see Radium) from a mercury arc lamp with an estimated candle power of 3,000, he exposed the eggs to the light for periods of 10 to 20 minutes, and in nearly all cases succeeded in producing changes which corresponded to those in the normal development of the egg.

All his experiments tend to prove his thesis that "all life in all of its aspects is mechanistic;" in other words, that life may be reduced to or explained by chemical or physical principles or by a combination of these. All human conduct, in morals, aesthetics, religion and science is, according to his view, mechanistic. The value of his biological experiments is universally recognized, but opinion differs as to their interpretation.

Loeb has written extensively, both for magazines and in book form, about his experiments and his theories of life. *Artificial Parthenogenesis and Fertilization, Chemical Fertilization of the Animal Egg* and *The Mechanistic Conception of Life* are three books which created a vast amount of discussion.

LOESS, *lo'es,* the name given a rock which in structure is between the finest sand and clay. It was doubtless deposited in the form of silt and contained a good proportion of soil, in which hard, round lumps, or nodules, of limestone were imbedded. In some localities it also contains nodules of iron, which are usually hollow. When broken open they have the appearance of rusty iron.

In the United States loess is found along the Mississippi River, where it forms most of the bluffs on the east bank, also in Kansas and in a few other localities. It is of a light brown color, and where it comes to the surface forms bluff or vertical banks. In some sections it contains many small tubes in a vertical position, which are supposed to have been formed by the silt hardening around the small roots of plants. When well watered, loess forms excellent soil for crops. The largest deposits occur in China.

The origin of loess is not well understood. In some places it lies above the drift formed during the Glacial Period and in others it seems to have been formed at the same time as the drift. It is closely associated with the Glacial Period and was probably formed by running water or as silt deposited on the beds of lakes. See Glacial Period.

LOFOTEN, *lo fo'ten,* or **LOFODEN,** *lo fo' den,* **ISLANDS,** an archipelago consisting of several large islands and many islets off the northwest coast of Norway, famous for the finest fisheries in the world. The principal islands are Öst-Vaagö, Gimsö, Vest-Vaagö, Flakstadö, Moskenaesö, Mosken, Värö and Röst. A line of coastwise steamers runs from Christiansand, calling at nearly all the islands on the coast. Moskenaesö is about forty-five miles from the mainland. The chief source of wealth is the cod fishing, carried on along the east of the islands in spring, when thousands of fishermen come from all parts of Northern Europe, doubling the usual population of about 42,900, and being accommodated in temporary huts and tents. The islands produce a little grain, barley being the principal crop, maturing in ninety days.

Between the islands of Moskenaesö and Mosken is the famous whirlpool, the Maelström, and navigation is dangerous in all the channels between the islands. Storms are severe, with frequent loss of life.

For particulars of the fisheries of Norway, with whose statistics Lofoten Islands are included, see Norway.

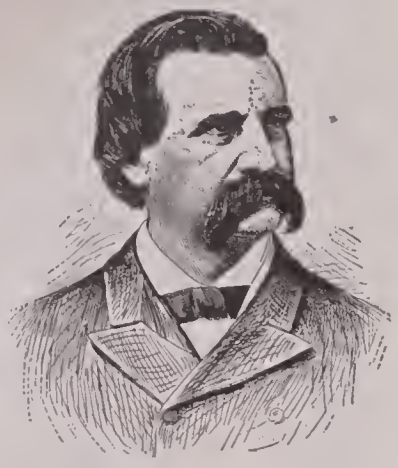
LOG, an apparatus by which a ship's rate of progress in the water is measured. The common log consists of a piece of board, about half an inch thick, cut in the shape of a quadrant of a circle of about six inches radius. A groove along its curved edges is filled with lead as a ballast, and it is so balanced as to float perpendicularly in the water with the greater part of it immersed. One end of the log line is fastened to the log by means of two legs. The log is thrown into the water and the length of line unwound from the reel gives the speed of the ship's sailing. The log line is divided into certain lengths by means of knots of colored cloth, which are proportionately equal to the number of geographical miles as a quarter or half minute is to an hour.

Log Book, a book that contains the official record of a ship on each voyage. In addition to the weather, there is transcribed daily every circumstance on board deserving of notice, such as mileage covered, offenses, deaths, births, marriages and conduct of seamen. The log book must be signed by the captain or officer on duty, and when the book is filled it is placed among the records of the ship's owners.

LO'GAN, John Alexander (1826-1886), an illustrious American military and political leader. James G. Blaine said of him that no other man in the history of the country had combined the elements of successful military and legislative leadership in such an eminent degree. His courage was of the highest order, and his will was indomitable, but he failed to crown his career with the honor so dear to American leaders, that of becoming the President of the United States. He was defeated for the nomination by Blaine in 1884, was nominated by acclamation for the Vice-Presidency,

and with Blaine lost the election to Grover Cleveland.

In appearance he was striking; his most distinguishing feature was his hair, which, being unusually long and jet black, prompted his associates affectionately to call him "Black Jack Logan." In 1851 he was graduated from Louisville University and was admitted to the bar. He was a member of the Illinois legislature in 1852-1853 and in 1856-1857, and was elected to Congress in 1858 as a Douglas Democrat, where he served until he entered the army in 1861. He distinguished himself in the siege of Vicksburg, his command being the first to enter the town, of which he was appointed military governor, and he also accompanied Sherman in his march to Atlanta. As a Republican he was elected to Congress from Illinois for two terms and was a House manager of the impeachment of President Andrew Johnson. After his defeat for the nomination for the Presidency he was elected to the United States Senate. He died in Washington, December 26, 1886.



JOHN A. LOGAN

He wrote *The Great Conspiracy: Its Origin and History,* a book which was naturally a partisan account of the war.

LOGAN, Mount, the loftiest mountain peak in Canada, and with the exception of Mount McKinley the loftiest in North America. Its summit is 19,539 feet above sea level. It is situated in the extreme southwest corner of Yukon Territory, near the Alaska boundary, and is a part of the Saint Elias Mountains (which see). Mount Saint Elias, from which the range takes its name, lies a few miles to the southwest. Until 1898, when the altitude of Mount McKinley was ascertained, Mount Logan was believed to be the highest peak in North America. It was named for Sir William E. Logan (1798-1875), the first director, from 1842 to 1869, of the Canadian Geological Survey.

Descending from the southern slopes of Mount Logan, and extending into Alaska, is the great Seward Glacier, fifty miles long and more than three miles wide at its narrowest point, one of the most magnificent Alpine glaciers in North America. It is one of the feeders of the Malaspina Glacier (which see), and was named for William H. Seward, the statesman who negotiated the purchase of Alaska by the United States.

LOGAN, Utah, the county seat of Cache County, is twenty-one miles south of the Idaho state line, sixty-nine miles north of Ogden and 100 miles north of Salt Lake City. It is on the Logan River, which flows into the Great Salt Lake, and on the Oregon Short Line Railroad. The city has a street railway system and an interurban line, the Ogden, Logan & Idaho Railway. The population, which includes a number of Scandinavians and Germans, in 1910 was 7,522.

Logan is finely situated at the northern end of a fertile valley nearly fifty miles long and ten miles wide, a great tract irrigated by springs and melting snows of the Wasatch Mountains. Here are situated the Utah Agricultural College; the Brigham Young College (Latter-Day Saints), a normal school and the New Jersey Academy (Presbyterian). The Federal building, erected in 1911 at a cost of $60,000, the Courthouse, the Temple and Tabernacle of the Latter-Day Saints, the Utah-Idaho Hospital, and the Carnegie Library, constructed in 1916, are buildings of note.

The city is the commercial center of Northern Utah and Southern Idaho. Agriculture and stock raising are the principal industries. Sugar beets, alfalfa, wheat and fruit are extensive crops, and thoroughbred horses, dairy cows and sheep lead the stock business. In Logan are flour mills, milk condensers, knitting factories and a large sugar factory. The value of the annual output of these industries is $2,000,000.

Logan was settled in 1859 and incorporated as a city in 1866. The commission form of government was adopted in 1911. M.R.H.

LOGANBERRY, *lo'gan ber i,* a valuable hybrid, or cross, between the blackberry and raspberry, named for its producer. It was developed in 1881, at Santa Cruz, California, by Judge J. H. Logan, from a seed of the Aughinbaugh blackberry accidentally fertilized from a neighboring raspberry, supposed to be the Old Red Antwerp. The Aughinbaugh is a species of the wild California blackberry, and was a chance seedling found about 1860 beneath the oaks at Alameda, California.

The loganberry is a strong-growing, dark green plant of the dewberry type, its fruit having the wild blackberry flavor. The loganberry fruit has many characteristics of both parents.

When ripe it has a rich, dark red color, and sometimes is an inch and a quarter in length. Its flavor is improved by cooking. It has been widely distributed throughout America and Europe since 1893. If careful winter protection is given, the plants can be grown as far north as many parts of New England, Southern Canada and the Middle States.

LOGANSPORT, IND., the county seat of Cass County, in the northwestern part of the state, is seventy-seven miles northwest of Indianapolis and 117 miles southeast of Chicago. It is situated at the junction of the Wabash and Eel rivers, and is served by the Wabash Railroad and several branches of the Pennsylvania and Vandalia railroads and by interurban lines. The population in 1910 was 19,052; in 1916 it was 21,046 (Federal estimate). The area is about four square miles.

The principal buildings of the city are the Federal building, courthouse, Carnegie Library, Masonic Temple, high school building and Saint Joseph's hospital. The Northern Indiana Hospital for the Insane, located here, is an institution occupying over thirty buildings and 300 acres of land valued at $725,000. Spencer and Riverside parks together contain 240 acres.

Logansport is an important railroad center and a shipping point for grain, lumber, pork and other farm produce. The railroad shops of the Pennsylvania and Vandalia roads employ more than 1,000 men. The chief manufactures are lumber, automobiles, car trucks, machinery, water wheels, radiators, kitchen cabinets, soaps, brooms, and woodworking and foundry products. Limestone quarrying, water power and natural gas are the industrial assets of the city.

The town, which was established in 1828, was named in honor of Captain Logan, a Shawnee chief. It became the county seat of Cass County in 1827, was incorporated in 1831 and chartered as a city in 1838. J.D.D.

LOGARITHMS, *log'a rith'mz,* a system of tables by reference to which the multiplication and division of inconveniently long numbers may be accomplished by addition and subtraction.

A logarithm is what is known in algebra as an *exponent.* The symbol x^2 expresses the same thing as $x \times x$. Since a logarithm is an exponent, it follows the laws for exponents, and the preparation of tables of logarithms depends upon a principle used in algebra. This principle may be expressed as follows: $a^x \times a^y = a^{x+y}$. In algebra, in other words, quantities may be multiplied by adding their exponents. If we say $a^x = l$ and $a^y = p$, then the quantities x and y are the logarithms of the numbers l and p to the base a. Each number in a table of logarithms is accompanied by its logarithm. Instead of multiplying two long numbers, the calculator may simply add their logarithms; the number in the table corresponding to the new logarithm thus obtained is the product. In like manner, if the problem be one of division, the result is obtained by subtracting the logarithm of the divisor from that of the dividend and looking up the corresponding number in the tables.

In the common system of logarithms, the base is 10. The expression 10^2 is equivalent to 10×10, and the product is 100. Here 2 is the logarithm of 100 to the base 10. In like manner $10^3 = 1{,}000$. The logarithm of 1,000 (written *log 1,000*) is 3.

To obtain the logarithm of the root of a quantity, it is only necessary to divide the logarithm of the given number by the figure indicating the root to be taken. Suppose one desires to find the cube root of 271. A reference to the table gives the logarithm of 271 as 2.4330. Divide by 3 and the result is 0.8110, which is found to be the logarithm of 6.471. Therefore, the cube root of 271 is 6.471. Similarly, in raising a number to a given power, the student multiplies the logarithm of that number by the exponent indicating the power.

Logarithms are useful for all sorts of long and complicated problems. They are used constantly by scientists in their calculations and particularly by astronomers and engineers. They are indispensable in the study of trigonometry, and their use is learned by students while studying that branch of mathematics. Their great practical utility was first shown by John Napier, who published his tables in 1614. Many high schools do not teach logarithms, and boys and girls, as a rule, are never required to become familiar with this branch of higher mathematics. G.B.D.

LOGGIA, *lahj'a,* or *law'ji a,* an Italian word meaning *lodge* or *gallery,* is used to denote any roofed edifice open on one or more sides to the weather. It is thus applied to well-known buildings, such as the Loggia of the Vatican at Rome, the great Loggia dei Lanzi and the Loggia del Bigallo at Florence. The name is also given to an open arcade along the side of a building, to the large, ornate windows, consisting of several parts, found in old Venetian palaces, and in America to a room open on one side to the air.

LOGIC, *loj'ik,* is pure reasoning, and to be logical is to argue reasonably upon a basis of fact in behalf of truth. Reasoning is the process by which conclusions regarding certain things are reached from what is already known about them. There are two processes, *induction* and *deduction,* by which these conclusions may be reached.

By *induction* a number of related facts about a certain thing are *drawn in* and put under a general law or truth. For instance, from the fact that heat expands iron, gold and platinum, the general conclusion is that *heat expands all metals.*

By *deduction* a particular conclusion about a certain thing is reached by *drawing out* facts from a knowledge of the class to which it belongs. Thus:

All animals with four legs are quadrupeds.
The horse has four legs.
Therefore, the horse is a quadruped.

The expression of an argument in this formal way is called a *syllogism.* Aristotle, a Greek philosopher (384-322 B. C.), originated the deductive form of reasoning.

LOG'WOOD, the most important dyewood known, so named because it is exported in logs. It is the red heartwood of a tree found in Mexico, Central America and some parts of the West Indies. The best logwood comes from Jamaica, Honduras and Santo Domingo, the Campeachy supply, formerly considered the best, is now almost exhausted. The texture is firm and the wood is heavy enough to sink in water; the color is a dark blood-red, which becomes almost black after long exposure. The infusion of the wood is also blood-red, which is readily yielded to boiling water. The shades produced vary from red to black; acids change it to the lighter shades, and alkalies to the darker hues. It is largely used for producing blacks on silk and wool and in the manufacture of ink. Medicinally it acts as a mild astringent, but it is now little used by physicians.

LOHENGRIN, *lo'en grin,* the hero of the German version of the legend of the knight of the swan. Besides the German, the legend has an English and a French version. The story is founded on two common themes of folklore, the changing of human beings into swans and the wife whose inquisitiveness results in disaster. The fable has been followed closely by Richard Wagner in his opera *Lohengrin.* The German story appears in the last stanzas of Wolfram von Eschenbach's *Parzifal,* in which Loherangrin, Parzifal's son, was sent from the castle of the Grail to help the young Duchess of Brabant. He arrives in a boat drawn by a swan, rescues the duchess from captivity and marries her. She begs him to tell her the story of his origin, which he does, after which he is forced to return to the Grail, by the terms of his vow. The widely-popular *Lohengrin Wedding March,* played at countless wedding ceremonies every year, is taken from Wagner's opera.

LOIRE, *lwahr,* in Roman times called the LIGER, is the longest river of France, having a total length of 620 miles and a drainage basin almost equal to one-fourth the area of the country. It rises in the Cévennes Mountains 4,500 feet above the sea, and flows in a northerly, then in a westerly direction, dividing France into two nearly equal parts, and emptying into the Bay of Biscay at Saint-Nazaire. Navigation on the Loire is attended with difficulties. In the wet season melting snows and heavy rains so increase the volume of the river that floods are of not infrequent occurrence, and during the period of summer drought it shrinks to an insignificant stream of sandbars and shallows.

Its estuary has been dredged to accommodate ocean vessels; dikes and embankments have been constructed at various points to control the floods, and a canal 125 miles in length has been built along the river to provide a reservoir for the overflow. Its utility has been further increased by canals connecting it with the Saône and the Seine, and by a canal between Roanne and Briare, the latter running parallel with it for 160 miles. The city of Nantes, thirty-seven miles from its mouth, is joined to the harbor of Brest by still another artificial channel.

LOK, *lohk,* or **LOKI,** *lo'ke,* in mythological legends of Northern Europe, was the spirit of strife and evil. Although a wicked deity and the embodiment of evil, he was supposed to be a very handsome, fascinating god. He shrewdly planned the death of Balder, when Frigga had induced all objects not to injure him. The mistletoe not being included, Loki made it into an arrow and gave it to the blind Hoder, who shot it at random. The dart struck Balder and killed him. Subsequently Loki was bound with ten chains and will continue chained, so the legend runs, until the twilight of the gods appears, when he will break his fetters; then the heavens will disappear, the earth will be submerged by the sea, and fire will consume the elements. Loki was considered far more clever

than the other gods, and when he desired he could exercise his ingenuity in behalf of the other gods, and the results were most beneficial. He was usually occupied, however, in wicked scheming. See MYTHOLOGY; ODIN; BALDER.

LOM'BARDS, from *langobard,* meaning *longbeard,* a tribe related to the Germans whose original home was on the Lower Elbe. In the first century they fought their way southward and eastward till they came to the Roman border on the Danube. For several centuries they were held there, then in the sixth century they invaded and made themselves masters of Pannonia. Under King Albion (568-572) they conquered the northern part of Italy, which still bears the name of Lombardy. During the reign of King Liutprand (712-744) the Lombard kingdom reached its greatest prosperity. The powerful and troublesome exarchate of Ravenna had been subdued, the petty princes and rebellious cities were under control, and because the Lombards had turned Roman Catholic even the Pope was friendly.

Peace did not last long, for after Liutprand's death war between the different cities and the ambitious dukes began again. The Pope, beginning to be alarmed about these savages whose conquests were bringing them so uncomfortably close to his own lands, asked the Frankish king to help him. The Lombards were compelled to give up all further invasion and even to turn over to the Church some of the cities they had conquered. This kept peace till 774, when Charlemagne sent back his wife, the daughter of the Lombard king, Desiderius. In the war that followed this insult, the Lombards were beaten, and in 803 Charlemagne crowned himself with the famous Iron Crown of Lombardy (see subhead under CROWN). All that remains of this savage and once powerful tribe is the name they gave to Northern Italy and the set of laws of Rothari, which was used in the Middle Ages as a model of laws by several German kingdoms.

LOMBARDY, that part of Northern Italy which derived its name from the Lombards, who occupied it in the sixth century, and which now comprises the provinces of Bergamo, Brescia, Como, Cremona, Mantua, Pavia and Sondrio. Lombardy is the most important industrial region in Italy. It produces immense quantities of wine and silk and is noted for its cheese. It covers an area of 9,374 square miles, almost exactly the area of New Hampshire; in 1911 its population was 4,786,907, eleven times as great as that of New Hampshire.

LOMOND, *lo'mund,* LOCH, the largest of the Scottish lakes, famous for its beautiful scenery. It is encircled by ranges of hills, and its surface is dotted with many islands. A branch of the Grampian Mountains, rising on the eastern side, culminates in Ben Lomond, 3,192 feet high, on the edge of the lake. Loch Lomond is twenty-three miles long and seven miles wide at the upper end, although only half a mile wide at the lower, or southern, end. It lies between Dumbartonshire on the west and the county of Stirling on the east. The name of this picturesque lake occurs frequently in a beautiful Scotch song, the opening lines of which are the familiar words:

By yon bonny banks and by yon bonny braes,
The sun shines bright on Loch Lomond,
Where me and my true love will ne'er meet again,
On the bonny, bonny banks of Loch Lomond.

LONDON, *lun'dun,* the county town of Middlesex County, a customs port of entry and the commercial center of Western Ontario. It is situated on the Thames River, 114 miles southwest of Toronto, 111 miles northeast of Detroit and twenty-three miles north of Lake Erie, by rail. The following railroads enter the city: Grand Trunk, Canadian Pacific, and a city-owned and operated railroad to Port Stanley—London's harbor on Lake Erie—connects with the Pere Marquette, Wabash and Michigan Central. Radial and branch lines north, south, east and west center at this point, and the city railway connects with steamship service to Canadian and United States lake ports. The first settlement was made here in 1826 by Peter McGregor, a Highland Scotchman; the city was incorporated in 1854. The population in 1911 was 46,300; in 1916 it was estimated at 58,055.

Through its fine shipping facilities by rail and by water, London has become a manufacturing and distributing center of importance. Between 12,000 and 13,000 people are employed in the various industrial establishments, the largest of which are iron and brass foundries, factories for making biscuits, candy, cigars, stoves, clothing and boilers, printing houses and breweries. There are large wholesale houses here. The produce market is an important factor in the city's trade. According to estimates, over $2,000,000 worth of fresh country products are sold here annually. The cheese alone is valued at $1,000,000. London has a garbage incinerator and an abattoir. Noteworthy buildings are the post office, custom house, city hall, Masonic Temple, Y. M. C. A. building, the Armories and Wolseley Barracks. The benevo-

lent institutions include Victoria and Saint Joseph's hospitals, an asylum with hospital buildings, Roman Catholic and Protestant orphanages and a home for aged people. Exceptional educational advantages are offered by the Western University, Huron College, Normal School, Saint Peter's Seminary, a collegiate institute, an industrial and arts school, medical and business colleges and a public library. London is the seat of an Anglican and a Roman Catholic bishop. Springbank Park is the largest park reservation. G.P.

STORY OF LONDON

LONDON, ENGLAND, the capital of the United Kingdom of Great Britain and Ireland and of the vast British Empire. The famous traveler-lecturer, E. Burton Holmes, thus summarizes its greatness:

> London is the most important place on earth. It is not only the most populous, but it is the greatest of great cities. No other city is the center of so many world-wide interests. Towards no other city do so many human beings look for inspiration, for commands and for rewards.

No other city contains so many spots that are associated with the lives of people who have played a prominent part in the history of the Anglo-Saxon race. No other city contains so many landmarks which remind one of poets whose works are among the masterpieces of the English language; of authors whose books have become the common heritage of the human race; of men of science who by their researches and discoveries have contributed to the advancement of mankind, and of men of great achievement in the domain of politics, commerce, finance and other branches of human activity.

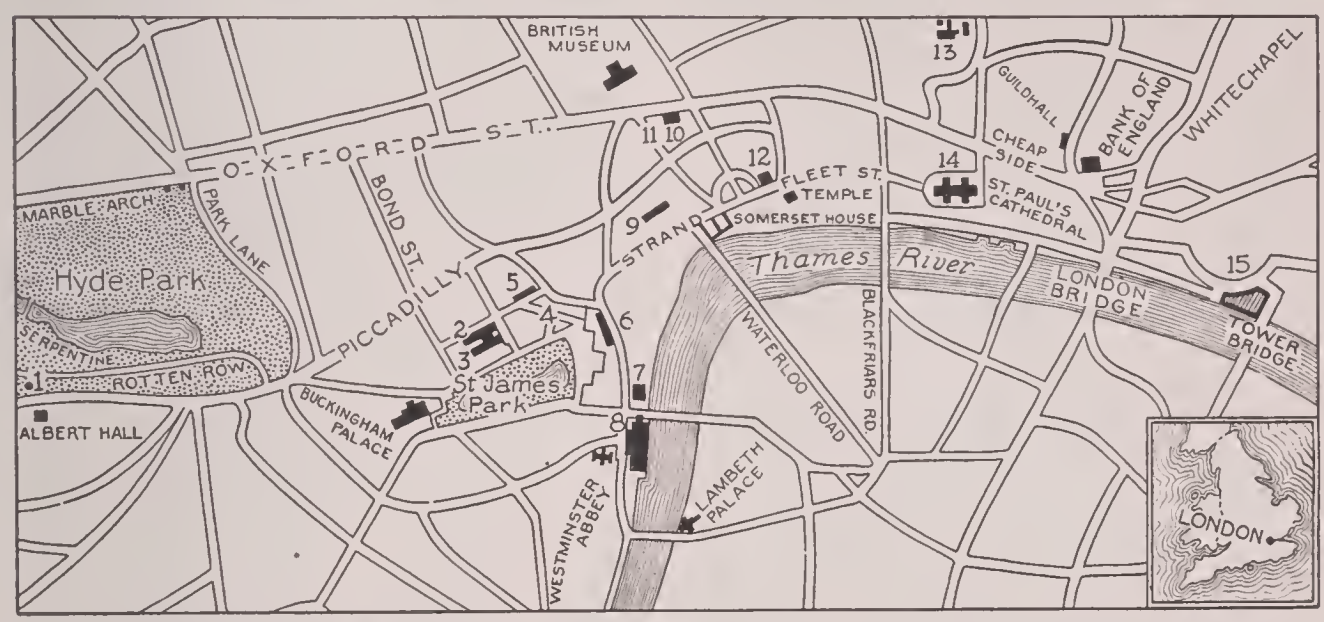
Situation and Extent. London is situated in the southeastern part of England on both banks of the River Thames, about forty miles from its mouth. The Thames is a tidal river up to London Bridge, and is navigable for the largest seagoing vessels. This location explains the commercial importance of the place. Modern London consists of the "city" and of the administrative county of London, which together occupy an area of 117 square miles; it is about one-third as large in area as Greater New York and one-half smaller than the area of Chicago; in 1911 it had a population of 4,521,685. It is divided into twenty-eight separate boroughs or municipalities, besides the "city," each of them governed by an elected council and mayor. But outside these limits there is a wide area which, with the "city" and county, forms what is known as Greater London. This vast collection of buildings extends about fifteen miles in every direction from Charing Cross, the official center of the metropolis, and covers an area of 443,424 acres, or about 700 square miles, and had a population of 7,251,358 inhabitants in 1911. (It should be noted that Greater New York, which is under one central municipal government, has a greater population than London proper. See the article NEW YORK [CITY] in these volumes.)

The City of London. The city of London, the historic nucleus around which Greater London has grown, is situated on the north bank of the river. It covers an area of about 670 acres, a little over a square mile. Here are located the great financial institutions and the offices of the large industrial, commercial and shipping companies whose activities extend all over the world. The resident population, which is composed of caretakers, or janitors, and policemen, numbers about 20,000; the day population, representing employees of the great business houses, is over 250,000; while the number of people that pass each day within the square mile occupied by the "city" is over 1,000,000. The "city" of London is a separate municipality, having a civic corporation of its own, at the head of which is the lord mayor of London, who holds his office for one year.

London Seen from Trafalgar Square. London is situated on low ground and on that account one cannot get a general view of the whole metropolis, but a characteristic view of this wonderful city may be obtained from

Trafalgar Square. The visitor standing in this square, which is one of the chief landmarks of the metropolis and is situated nearly in the center of Greater London, beholds a sight probably unequaled elsewhere in the world. In the middle of the square is the beautiful Nelson Column, erected to the memory of the greatest seaman of England. The base of this column is adorned by the four famous bronze lions, the work of Sir Edwin Landseer. Southward stretches Whitehall, a broad thoroughfare lined with solid blocks of buildings occupied by the chief government offices, where the business of the country and boulevards in the world. Facing the square on the north side is the National Gallery, containing one of the most valuable collections of paintings in the world.

The Strand and Fleet Street. Going east from Trafalgar Square one enters the Strand, which is considered by many to be London's characteristic thoroughfare. Among the important buildings in this street are the Law Courts, a magnificent pile of buildings in the Gothic style, erected in the latter part of the nineteenth century. The continuation of the Strand is formed by Fleet Street, the largest newspaper publishing center in the world.



MAP OF THE CENTRAL PART OF LONDON

(1) Albert Memorial
(2) Pall Mall
(3) St. James Palace
(4) Trafalgar Square
(5) National Gallery
(6) Horse Guards
(7) New Scotland Yard
(8) Houses of Parliament
(9) Covent Garden
(10) Lincoln's Inn
(11) Drury Lane
(12) Old Law Courts
(13) Charterhouse
(14) St. Paul's Cathedral
(15) Tower of London

that of the whole empire are conducted. On the right-hand side of this thoroughfare extends the celebrated Downing Street, where is situated the Foreign Office, from which the international policy of the British Empire is directed. At the far end of Whitehall one gets a glimpse of Westminster Abbey (which see), and to the left of it the Houses of Parliament (see PARLIAMENT). To the west is the beautiful arch of the admiralty, so named because it adjoins the admiralty building. Through it passes a magnificent new avenue which leads to Buckingham Palace, the residence of the king. In front of the palace is the imposing Victoria Memorial, erected by popular subscription to the memory of Queen Victoria. Looking southeast through Northumberland Avenue one sees part of the Thames Embankment, which is one of the most magnificent Here are situated the editorial offices of the London newspapers, as well as those of the provincial, colonial and foreign newspaper correspondents.

Saint Paul's. From Fleet Street one enters Ludgate Hill, where Saint Paul's Cathedral is situated. The cathedral, completed in 1710 according to designs made by Sir Christopher Wren, is a magnificent building 510 feet in length, with a great dome 400 feet in height. This dome is visible from most parts of the metropolis and is one of the conspicuous sights of London. Going farther east one reaches the heart of the city, the Bank of England and the Mansion House, which is the official residence of the lord mayor of London.

The Guildhall. Not far from the Bank of England and the Mansion House is the famous Guildhall which has served as the council hall

of the city for over 500 years. Here are held the most important civic functions, not only of London, but of the British Empire. One of the greatest honors that can be bestowed upon any man, British or foreigner, is to be entertained by the lord mayor of London at a public banquet at the Guildhall. This distinction was accorded Theodore Roosevelt, after his return from Africa in 1910. One of the great political events of the year is the banquet given by the lord mayor on the night of his inauguration, November 9. The speech delivered on this occasion by the Prime Minister or the Foreign Secretary is always awaited with the greatest interest, for as a rule it contains some important announcement defining the attitude of the government upon the chief questions of the day.

Other Important Streets and Buildings. Within the county of London alone there are 2,210 miles of streets, and only those of particular interest can be mentioned. Among these are Piccadilly, along which are situated many famous private residences and the most exclusive clubs, and Regent Street. At their intersection is Piccadilly Circus, one of the nodal points of the metropolis. Bond Street, where the most exclusive and fashionable shops are situated; Aldwych and Kingsway, two magnificent new thoroughfares, starting in the Strand; and Oxford Street and Holborn are other famous avenues. One block north of Oxford Street is the British Museum (which see). Among many other museums and art galleries are the Victoria and Albert Museum, which contains a valuable collection illustrating the development of the machinery used in many modern industries, as well as of the tools employed in a great number of the finer arts and crafts; and the Tate Gallery, noted for its collection of modern paintings.

Parks. Judged by the standard of old European cities, London is well supplied with parks. There are in and around London over 18,000 acres of parks, squares and open spaces maintained by local authorities. The most famous of the parks is Hyde Park, situated in the heart of the west end of London, and covering 364 acres. There is not another park in the world that presents such an animated and brilliant sight during the height of the London season, during the months of June and July. Every Sunday numerous open-air meetings are held in this park. Scores of speakers, addressing their audiences from improvised platforms, discourse upon all sorts of topics—religious, political, scientific and social. Adjoining Hyde Park are the extensive and beautiful Kensington Gardens, where the imposing Albert Memorial is situated. Another beautiful park is Regent's, which contains a zoölogical garden with the largest collection of animals in the world; and the gardens of the Royal Botanic Society. On the southern side of the city is beautiful Greenwich Park, with its famous Greenwich Observatory.

More characteristic of London than its formal parks are the heaths, or commons, which are preserved nearly in their natural condition for the use of the people. The largest and most beautiful of these are Hampstead Heath on the north, and Wimbledon Common, Putney Common and Black Heath, on the south.

Bridges. The oldest and most famous of the many bridges spanning the Thames is London Bridge. The old bridge, built of stone early in the thirteenth century to replace an older one built of wood, had a row of houses along it, which gave it the appearance of a street. The present granite bridge, built in 1831, was enlarged in 1904. It connects the "city" with two thickly-populated industrial boroughs, and the stream of traffic across it all day long is one of the unforgetable sights of London. Another beautiful bridge is the Tower Bridge, built not far from the famous Tower of London.

Fogs and Smoke. London is subjected in winter to fogs, which are made denser by the smoke which is continuously poured into the atmosphere from innumerable chimneys. In a recent report the city medical officer of health stated that in one month the amount of soot, grit, dust and other matter registered as falling in the city amounted to fifty-five tons. On account of this the city has a somber aspect and the buildings look dingy and unattractive. Nevertheless London is one of the most healthful of the great cities of the world. This is the result of vigilant watchfulness over the water supply and the sewerage systems; of stringent building regulations, and of the attention bestowed by the authorities upon all questions of public and private sanitation.

Commerce. In normal years London is the busiest port in the world, with an annual trade approximating $2,000,000,000. The London docks, which are provided with all the facilities to load and unload the largest steamers in the shortest time, extend from near London Bridge down the river to Tilbury, a distance of over thirty-five miles. Three-fourths of the

OUTLINE AND QUESTIONS ON LONDON

Outline

I. Location and Size

(1) Southeastern part of England
(2) On Thames River
(3) Area
(4) Population
  (a) Of the "city"
  (b) Of Greater London—largest in the world
(5) Comparison with New York

II. Description

(1) Chief streets and squares
  (a) Trafalgar Square
  (b) Streets leading from it
  (c) The Strand
  (d) Fleet Street
  (e) Piccadilly
(2) Famous buildings
  (a) Westminster Abbey
  (b) Houses of Parliament
  (c) Buckingham Palace
  (d) National Gallery
  (e) Law Courts
  (f) Saint Paul's
  (g) The Guildhall
  (h) British Museum
(3) Parks
  (a) Hyde Park
  (b) Regent's
  (c) Heaths or commons
(4) Bridges
(5) Fogs and smoke

III. Industrial Life

(1) Manufactures
  (a) Greatest manufacturing center in kingdom
  (b) Chief products
(2) Commerce

IV. Government

(1) The lord mayor of the "city"
(2) Separate boroughs

V. History

(1) Antiquity of the city
(2) Under William the Conqueror
(3) Disasters
(4) Steady modern growth

Questions

What honor was shown to a former United States President by the mayor of the "city" of London?

What famous document in the possession of the city dates back to the eleventh century?

How does London rank among the cities of the world as to population? As to commercial importance?

Where is the greatest newspaper center in the world located?

How long are the London docks? How does the city rank among cities of the kingdom as to commercial importance? Among those of the world?

What is the king's London residence called?

What is the weight of all the soot, dust and dirt which falls in London in a month?

What marks the center of Greater London? What is the chief ornament of this square?

When was the present London Bridge built? What was there noteworthy about the former one?

How large a resident population has the "city" of London? How greatly is this increased during the day?

What is London's most famous park, and how large is it?

How much longer has this city been in existence than has the second largest city in the world?

How much larger is the area of Greater London than that of the "city" and administrative county? The population?

overseas trade of London consists of imports; more than one-third of the imports of Great Britain come in through London. Besides its overseas trade the coastwise shipping of London is greater than that of all the other English ports combined. London is also the center from which radiate all the great railroad lines of the United Kingdom.

Industry. London is the largest manufacturing center in the United Kingdom and one of the most important in the world, although this fact escapes notice in the vastness of this city. Among the thousands of establishments, each of which employs hundreds of people, are breweries, distilleries, sugar refineries, tanneries, shipyards, publishing and printing houses, and factories, producing practically all commodities in common use.

History. London was a good-sized trading place as early as the first invasion of the Romans, in 55 B.C. It became the capital of the kingdom of Alfred the Great in the ninth century, and in 1066 received from William the

LONDON
At the time of Shakespeare's death.

Conqueror a charter which has never been destroyed. With the settlement of the Normans there began the erection of larger and more imposing churches, monasteries and public buildings. Wars, epidemics, famines and fires hindered the city's growth throughout the Middle Ages and well into the modern period; late in 1664 a great plague broke out that carried off over 100,000 people in six months, and in 1666 a fire swept away the greater part of the city. As in many other cases, however, a new and better city rose from the ruins. Streets were made wider, and more substantial buildings were erected. Since the beginning of the nineteenth century London's growth in population and wealth has continued with little interruption.

The reader will find many intimate and fascinating descriptions of various parts of London and its outlying towns in the novels of Dickens. A recent book of great interest is Edward V. Lucas' *A Wanderer in London.* O.B.

Consult Mitton's *Children's Book of London:* Douglas-Irwin's *History of London:* Hare's *Walks in London.*

LONDON, JACK (1876-1916), a writer of novels and short stories, who probably put into his books more of his own life than did any other American author. *The God of His Fathers, A Daughter of the Snows, The Children of the Frost, The People of the Abyss,* all grew out of his own experiences. In *The Son of the Wolf* and *The Call of the Wild,* Alaskan stories, the author gave his own actual experience in the country which he described. *The Cruise of the Dazzler,* a boy's story, is the account of his own adventures as a boy on San Francisco Bay.

JACK LONDON

London was a native son of California, born in San Francisco, January 12, 1876. He attended college one year, but being of a roving disposition left school and became successively longshoreman, sailor, gold hunter in the Klondike, and wanderer. *The Call of the Wild,* an animal story depicting reversion to type, in which an intelligent, domesticated dog degenerated into a wolf, is a good example of the author's art in picturing the ghastly somberness of the frozen North. *The Valley of the Moon* chronicles the hardships of a young pugilist in the city and his ultimate success as a truck gardener in California; *The Game* is also a story of a pugilist. His books all show his hatred of sham and pretense and his deep sympathy with humanity.

LONDON COMPANY. In 1606 there was founded in London a corporation which had as its purpose the establishing of colonies in North America. This was shortly afterward divided into two branches, the Plymouth, or North Virginia Company, and the London, or Virginia, Company. The former was to plant a colony between 41° and 45° north latitude, the latter between 34° and 38° north latitude, while the branch which first carried out its purpose was to have added to its territory all the land between 38° and 41°. The London Company was the first to act, sending out a party of

colonists and adventurers, 105 in number, late in 1606, and it was this party which founded Jamestown (see VIRGINIA, subhead *History*). A large proportion of these emigrants were of the gentleman class, unaccustomed to labor, and that fact accounts for the failure of the colony to grow and thrive.

The London Company, whose name was changed in 1609 to "The Treasurer and Company of Adventurers and Planters of the City of London for the First Colony in Virginia," had charge of the administration of the colony of Virginia until 1624, when its charter was withdrawn.

LONDON UNIVERSITY, an institution of London which differs from other universities in that it is an examining and not a teaching body. Connected with it, so closely that they really constitute a part of the institution, are a number of schools and colleges which prepare students for their examinations before the governing body. There are medical colleges, theological schools, agricultural and technical schools, and general faculties of arts and sciences, so that the scope is a very wide one. The various colleges had before the outbreak of the War of the Nations an enrollment of more than 5,000.

LONG, JOHN LUTHER (1861-), an American novelist who is most widely known for his *Madame Butterfly,* a story of Japan. Belasco's play, in which Blanche Bates starred, and Puccinni's opera, in which Geraldine Farrar had a notable success, were founded on this story. Long wrote, in addition, *Miss Cherry-Blossom of Tokyo, The Fox-Woman* and *War—or What Happens When One Loves One's Enemy,* and collaboroted with E. C. Carpenter in a play entitled *The Dragon Fly.* He was born in Pennsylvania, studied law, and engaged in practice in Philadelphia. He did not, like so many lawyers with literary tendencies, give up his profession for writing, but divided his time between the two.

LONG BEACH, CAL., a noted watering place on the southern coast of the state, about twenty miles south of the city of Los Angeles, in Los Angeles County. It has a delightful location on San Pedro harbor, and its beach is one of the finest on the Pacific coast. The locality abounds in scenic attractions, and the beach has a large pleasure pier, an auditorium which seats about 4,000 people, and many hotels and cottages. A number of electric lines enter the city from Pasadena, Los Angeles and adjacent towns, but travelers from greater distances arrive on the Southern Pacific and the San Pedro, Los Angeles & Salt Lake railways. Steamers ply between Long Beach and Santa Catalina Island, to the southwest. Although Long Beach is known primarily as a watering place, it is rapidly becoming a commercial center, and already has a fine trade in fruit, produce and lumber. The population increased from 17,809 in 1910 to 27,587 in 1916 (Federal estimate). In 1915 the city adopted the commission form of government.

LONG BRANCH, N. J., a city of Monmouth County and one of the oldest seaside summer resorts in the United States. It is located forty-five miles by rail and thirty-five miles by water south of New York City, and about seventy miles northeast of Philadelphia. It is on the Pennsylvania and the Central of New Jersey railroads and on electric interurban lines. During the summer season boats sail regularly between Long Branch and New York. The population was 13,298 in 1910; it was estimated at 15,395 in 1916. During the summer months there are frequently as many as 50,000 visitors.

The city occupies nearly nine square miles on a plateau extending westward from a cliff twenty to thirty feet above the beach and sea. Great bulkheads and jetties protect the land from the waves. Along the bluff is Ocean Avenue, five miles in length, and a board walk two miles long, which is a favorite promenade. Hotels and boarding houses, parks and casinos, handsome cottages, bathing houses along the beach and the adjacent pleasure resorts are the attractions of the city. The Federal building, city hall, public library, hospital, banks and school buildings are worthy of note. The Monmouth County horse show and races are held here each year in July. There is some manufacturing in the city, especially that of underwear and wearing apparel.

In 1734 the site of the town was an Indian fishing village and was called "Land's End." It was owned by a British officer before the War of Independence, when it was confiscated by the government and later developed by private enterprise as a bathing resort. The present name seems to refer to the "long branch" of the Shrewsbury River. Presidents Grant and Garfield spent vacations in Long Branch, and in Ocean Park stands a monument erected to the memory of Garfield, who died here in 1881. The place was chartered as a city in 1904, and in 1912 adopted the commission form of government. B.B.N.

LONGEVITY, *lon jev' i ti.* See LIFE, LENGTH OF.

LONGFELLOW, HENRY WADSWORTH (1807-1882), an American poet whose verse is read and loved in countless homes and schools. Because of his appreciation of the trials, the hopes and the ideals that are common to all humanity, because of his love for all that is true and beautiful, and because of his gift for simple yet musical expression, Longfellow has won an enduring place in the affections of numberless readers in his own and in foreign lands. James Whitcomb Riley, who is as dearly loved by the children as is Longfellow, has written of the older poet:

His verse blooms like a flower, night and day;
Bees cluster round his rhymes; and twitterings
Of lark and swallow, in an endless May,
Are mingling with the tender songs he sings.
Nor shall he cease to sing—in every lay
Of Nature's voice he sings—and will alway.

Longfellow was born at Portland, Me., on February 27, 1807. His father, Stephen Longfellow, was a Harvard graduate, a prosperous lawyer and at one time a member of Congress—a kindly and lovable man; his mother, Zilpah Wadsworth, was a lover of nature, music and poetry—a fine and cultured woman, descended from General Wadsworth of Revolutionary fame, and from the John Alden and Priscilla whom Longfellow afterwards celebrated. The home life in the old Portland house was well-nigh ideal, and the poet carried with him all his life the influence of these early happy years. While fond of walking and of various out-of-door sports, he found his chief delight in music and in reading; and in his father's library he studied the choicest pages of English literature. The effects of this reading on his ambition became evident when there appeared, in 1820, in the Portland *Gazette*, a poem signed "Henry." While better than most boys of thirteen could have written, this poem had no real merit; it did not, as did some of Bryant's youthful productions, hold out promise of future genius.

His Early Life. At fifteen he entered Bowdoin College at Brunswick, Me., and there his geniality and uniform courtesy made him a general favorite. He was graduated in 1825, in the class with Hawthorne and Franklin Pierce, leaving behind him an enviable record for regularity and brilliancy. So good, in fact, was the impression made by him that very shortly after his graduation he was offered the professorship of modern languages at Bowdoin. He had pondered much over what profession he should adopt, and had finally decided to

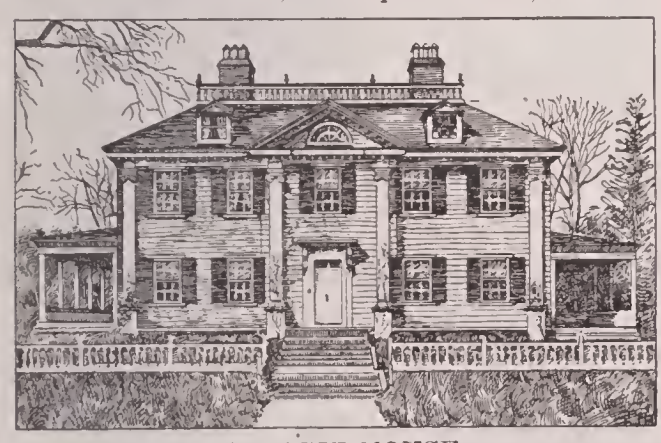
HENRY WADSWORTH LONGFELLOW

study law in his father's office, but his enthusiasm and talent for literature caused him to accept the offer gladly. After some months of rest at home, he sailed for Europe, as the college authorities had suggested, to prepare himself for his new duties. He had a remarkable gift for learning and remembering languages, and between 1826 and 1829 traveled in France, Spain and Italy, reading and speaking

the various languages almost without effort. His study went deeper than mere language rules, however; it mastered the literatures and the medieval legendary history of those countries.

When, at twenty-two, he returned to Bowdoin, it was to find himself perhaps the first scholar in America—the pioneer in giving to the still somewhat crude young country the culture of Europe. America was ready for such a service; Longfellow had grown up to meet a unique opportunity. He had also the ability and the methodical habits which made possible a prodigious amount of hard work, and there came from his pen, in rapid succession, prose sketches, reviews, translations of foreign poems and textbooks. His *Outre-Mer,* a collection of travel sketches somewhat after the manner of Irving's *Sketch-Book,* was also written during his years at Bowdoin.

In 1834 he received an offer of a professorship of modern languages at Harvard University, and the following year again set out for Europe. His wife, Mary Potter, whom he had married in 1831, accompanied him, and the



CRAIGIE HOUSE
The home of Longfellow at Cambridge, Mass.

trip seemed to contain as much of joy as of benefit. In London, the Longfellows found many friends and a delightful welcome, for, while the poet had as yet done little original work, the promise for the future was evident. They spent six months in Stockholm and Copenhagen, in a study of the Norwegian, Finnish, Danish and Swedish languages, and in October went on to Holland. Here Mrs. Longfellow fell ill and died. That this caused no pause in Longfellow's work does not prove him unfeeling. Perhaps there was in his life nothing more heroic than the silence, firm, but not bitter or sullen, with which he bore this grief and the other which came later.

After visiting other parts of the Continent and meeting many eminent men, Longfellow returned to his new duties. During the professorship of seventeen years at Harvard, he won the love of young and old alike, and tried, by no means in vain, to help the students to gain from their work in modern languages not mere technical knowledge, but some perception of the spirit and meaning of old-world literature.

A Great Career Begun. After living for some years as a lodger in the old Craigie House, Washington's headquarters in 1775, he bought the house, and to it, in 1843, brought his second bride, Miss Frances Appleton. With almost ideal domestic surroundings, and in constant touch with all of New England's famous group of authors, he felt himself thoroughly content and at his best, and the years that followed were the most productive of his life. Such poems as *The Reaper and the Flowers, The Psalm of Life, The Wreck of the Hesperus* and *Excelsior* had already won him fame, and when there appeared, in 1847, *Evangeline,* he became at once the most widely read and universally loved poet in America. This poem, the plot for which had been furnished by Hawthorne, who thought it could be told better in poetic form than in prose, has never lost its popularity. *Hiawatha,* a most remarkable success, followed in 1855, and in 1858, *The Courtship of Miles Standish;* many of his best-loved short poems were published in the intervals.

But all of Longfellow's interests were not literary. "The Children's Poet," as he is so frequently called, had the most constant and ready sympathy for his own children, the three girls of whom everyone knows from the lines,

> Grave Alice and laughing Allegra,
> And Edith with golden hair,

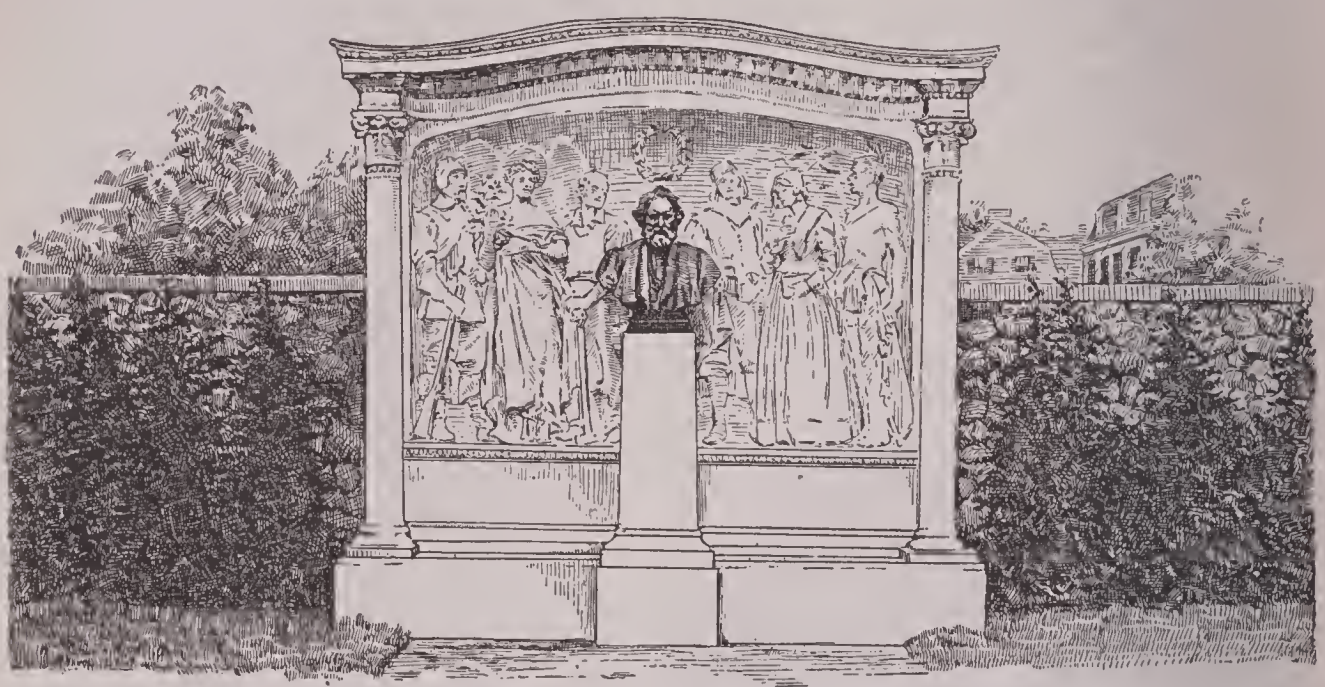
and two boys, Charles and Ernest. Sharing in their games, even coasting "for two hours on the bright hillside," as his journal records, sent him back to his work with renewed ability to write the poems in which children still delight. Not that the poems were written for children; but the poet had a nature so simple and genial, a mind which saw things so clearly, and a genius which described so well what others felt and saw, that even children can understand and love him.

The happy home life came to an abrupt and tragic end in 1861. Mrs. Longfellow had been making wax impressions to amuse the children, when a burning drop of wax fired her

dress, and before her husband could extinguish the flames, burned her fatally. As he had met his other grief in silence, so he met this; but much of the light-hearted and buoyant character was gone from his verse, and it was only his courage which enabled him to go on with his work.

In 1863 the appearance of the *Tales of a Wayside Inn,* in which is included the popular favorite, *Paul Revere's Ride,* showed that he had once more in a measure found himself. His care for his children was constant, and in 1868-69 his three daughters accompanied him on a final visit to Europe. Edinburgh, Oxford and Cambridge universities honored him, and everywhere an enthusiastic popular welcome awaited him. The remainder of his life passed quietly, and to escape sad memories he did a vast amount of work in his later years. Besides original poems, there came from his pen an excellent translation of Dante's *Divine Comedy,* and translations, from eight different languages, of many poems which appeared in the *Poems of Places,* in thirty-one volumes, which he himself edited. To the end of his life he personally attended to his correspondence and received his numerous visitors kindly. One writer has said of him, "Perhaps the most remarkable traits in Longfellow's character were his accessibility and his charity." Rarely, if ever, did he refuse to see a caller, however much of an intrusion the call might seem to be, and children were received as courteously as were grown people. On the poet's seventy-second birthday, the school children of Cambridge presented him with an armchair made from the chestnut tree which he himself had made famous in *The Village Blacksmith.* The gift delighted him, and he wrote a poem about it, of which a copy was given to every child who came to see him.

Finally came illness, pain and feebleness, but they wrung no complaint from him, and his kindliness and courtesy never left him. His mind, too, remained vigorous, and *The Bells of San Blas* was written less than two weeks before his death, which occurred on the twenty-fourth of March, 1882. He was buried in Mount Auburn Cemetery, at Cambridge, near Agassiz, Sumner and Felton, his friends; and his bust was placed in the Poet's Corner at Westminster Abbey, an honor no other American has had.



LONGFELLOW MEMORIAL

Erected at Cambridge, in 1916. The sculptured figures, from left to right, are Miles Standish, Sandalphon, the Village Blacksmith, the Spanish Student, Evangeline and Hiawatha.

Summary. Longfellow's character and life have both been compared to a poem—well-balanced, beautiful, strong, with nothing to hide or excuse. Lowell said of him that his "choicest verse is harsher toned than he," and such was the impression of everyone who met him. His very appearance carried out this thought: of medium height, with features heavy, but sensitive, he had a dignity, a sunny gravity, which set him apart at first glance as a man of no ordinary character. Like Emerson, he was all his life innocent with the innocence of a child.

Longfellow's Birthday

SUGGESTIVE PROGRAMS

The heights by great men reached and kept
Were not attained by sudden flight,
But they while their companions slept
Were toiling upward in the night.
—*Longfellow.*

I

Song, *O Hemlock Tree*.....*Longfellow*
The Wreck of the Hesperus..*Longfellow*
Longfellow.....*Katherine Lee Bates*
To H. W. L.....*Lowell*
A Psalm of Life.....*Longfellow*
Essay, *The Boy Longfellow*
Longfellow.....*William Winter*
The Poet and the Children.....*Whittier*
The Village Blacksmith.....*Longfellow*
Dramatization from *Evangeline*
Longfellow.....*Paul Hamilton Hayne*
The Luck of Edenhall.....*Longfellow*

II

Song, *The Bridge*.....*Longfellow*
The Bell of Atri.....*Longfellow*
Whose Shall the Welcome Be?.....
.....*Elizabeth Stuart Phelps*
Longfellow..... *H. C. Bunner*
Excelsior .....*Longfellow*
Essay, *The Friend of Children*
In Memoriam.....*Austin Dobson*
Longfellow Dead..*Paul Hamilton Hayne*
The Old Clock on the Stairs..*Longfellow*
Dramatization from *Miles Standish*
The Skeleton in Armor.....*Longfellow*
Vale et Salve.....*Edith M. Thomas*

Longfellow's work is well suited to the beginner in reading poetry. It is simple and easy to read, but musical and full of thoughts that appeal to any reader. The "Poet of the Commonplace" he has been called; and so, in a sense, he was, for he lifted commonplace things up into the realm of poetry, and brought to notice beauties before unthought of. Because they speak of home and of everyday work, of universal experiences, some of his shorter poems are probably more widely read, both in Europe and in America, than those of any other poet in the language.

It is rather whole poems than scattered sayings from Longfellow which have become familiar the world over, but the following quotations are among those which are so much a part of the language that the person who makes use of them scarcely stops to think who wrote them first:

Look, then, into thine heart, and write!

Lives of great men all remind us
We can make our lives sublime.

Into each life some rain must fall,
Some days must be dark and dreary.

This is the forest primeval.

Blossomed the lovely stars, the forget-me-nots of the angels.

There are no birds in last year's nest.

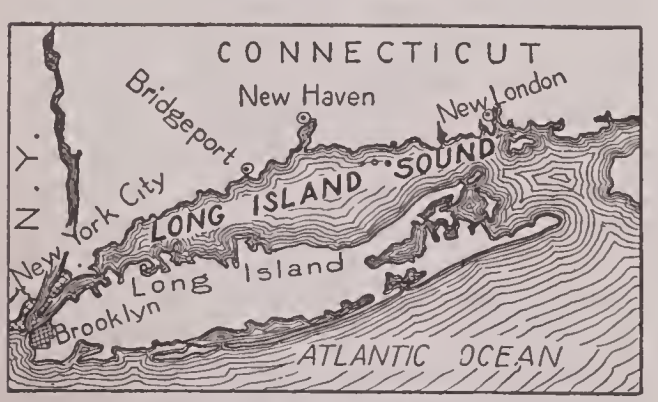
Home-keeping hearts are happiest.

C.W.K.

Consult Higginson's *Henry Wadsworth Longfellow;* Perry's *The Centenary of Longfellow;* Trent's *Longfellow and Other Essays.*

LONG ISLAND, a long, narrow strip of land, a part of the state of New York, about 118 miles in length and varying in width from twelve to twenty-three miles, extending east from the mouth of the Hudson River. It is connected with New York City, across East River, by four suspension bridges (see BRIDGE, subhead *Suspension Bridges*) and is separated from Connecticut by Long Island Sound. The transportation facilities are of the best. A large portion of the island is under cultivation, and extensive market gardening furnishes large supplies of produce for New York and Brooklyn. Other portions of the island are comparatively wild. Brooklyn, now a part of the city of New York, is the principal city, but the island is famous for its great number of summer resorts and as the home of many thousands of people whose business interests are on Manhattan Island, the original New York City. See NEW YORK (City).

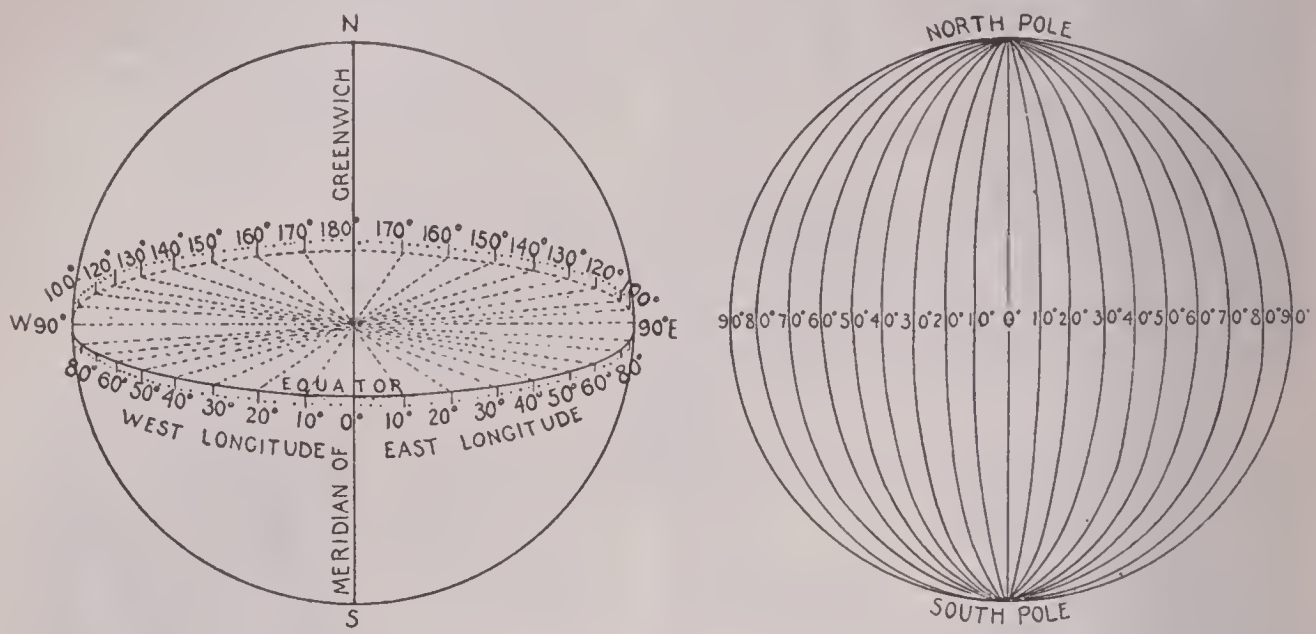
Long Island Sound, an arm of the Atlantic Ocean, 110 miles long and from twenty to twenty-five miles wide, which separates Westchester County, New York, and the state of Connecticut from Long Island. It is connected with upper New York Bay by the East River, and is fed by the Thames, Housatonic, Mystic and Connecticut rivers. Its shores contain excellent harbors. Large numbers of vessels navigate its waters, for it is a convenient "inside" route from New York to Providence and Boston. In the beautiful suburban villages which line its shores are homes of thousands of men whose business interests are in New York



LOCATION MAP

City. These towns are famous for yachting clubs, golf links and clubhouses. On the Long Island shore there are valuable oyster beds and fisheries, and large areas are devoted to market gardening. On the Connecticut side are located a number of thriving manufacturing centers. T.E.F.

LONGITUDE, *lon'ji tude.* If you were to travel directly north from wherever you now are, and a second person fifty miles east of you and a third fifty miles west of you were also to travel north, your paths would all meet at the north pole. Each would have followed a line of *longitude,* which is a north and south line along the earth's surface. The earth may



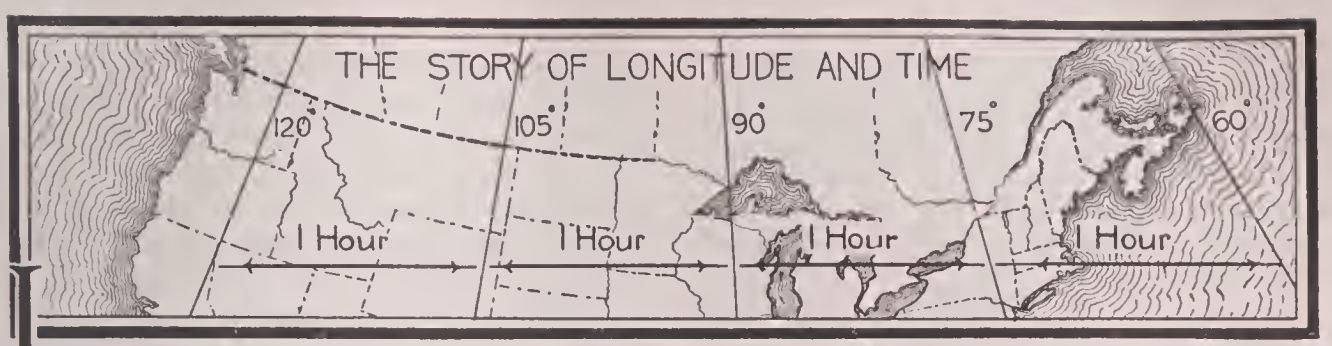
DEGREES OF LONGITUDE

be thought of as a huge ball divided into 360 north-and-south sections, the lines between the sections being the *meridians,* or principal lines of longitude. Of course the earth has no real meridians, so for convenience most nations agree upon an imaginary meridian running through Greenwich observatory, near London, as the principal meridian, with others at intervals of $\frac{1}{360}$ part of the way around the world.

A degree of longitude is the distance between a point on any meridian and the point directly east or west on the next meridian. New York, which is shown by the map to be 74° west longitude, is therefore 74 meridians from Greenwich. A comparison with the ball will make it plain that the space between two meridians is greatest at the equator, and becomes smaller as the poles are neared. Thus it is that at New Orleans a degree of longitude is about sixty miles, while at Winnipeg it is less than forty-five miles.

Related Subjects. The reader is referred to the following articles:

Degree
Geography
Greenwich
Latitude
Longitude and Time
Meridian
Pole



LONGITUDE AND TIME. Distances on the earth's surface are measured not only in miles, but in degrees of longitude and in time. As explained in the article immediately preceding, the earth is divided into 360 north-and-south sections, each one of which is a *degree* of space, marked by imaginary lines called *meridians;* also, a degree of longitude is the distance between a point on any meridian and the point directly east or west on the next meridian. Since the earth turns on its axis once in 24 hours, every point on its surface will describe a circumference (360°) in that space of time. In other words, it takes 24 hours for the entire 360° of the earth's circumference to pass beneath the sun. Then, since 24 hours of time are equivalent to 360° of space, 1 hour of time represents $\frac{1}{24}$ of 360° of space, or 15° of space. See DEGREE.

This means that the sun apparently travels through 15° in one hour. How far, then, will it travel in one minute and in one second? Clearly there must be smaller divisions of space measurement than the degree, just as there are smaller divisions of time than the hour. These divisions are minutes and seconds of space, the symbols of which are small, slanting marks written to the right of the number; *15 minutes* is 15′, and *15 seconds,* 15″. These must not be confused with minutes and seconds of time, for they are as different as hours and degrees. The minute of space is $\frac{1}{60}$ of a degree, and the second is $\frac{1}{60}$ of a minute. We have then the following table, the sign = meaning *is equivalent to:*

24 hours of time = 360° of space
1 hour of time = 15° of space
4 minutes ($\frac{1}{15}$ hour) of time = 1° of space
1 minute of time = 15′ of space
1 second of time = 15″ of space

As a common point from which to reckon longitude the English-speaking world has selected the meridian passing through Greenwich, England, near London, where there has been for many years a great observatory. The longitude of Greenwich is therefore 0°. See GREENWICH.

Practical Applications. It follows, then, that a distance expressed in degrees of longitude may also be expressed in measures of time, and vice versa. In the solution of problems based on the above principles, the following rules will be applied:

(a) To find the difference in longitude between two places when both are east or both are west of a given meridian, subtract the lesser longitude from the greater; if one is east and the otner west, add the two longitudes. To obtain the correct difference when the sum exceeds 180°, subtract the sum from 360°.

(b) If the time of a place is given, to find the time of a place east, add to the given time the difference in time between the two places (see (e) below). To find the time of a place west, subtract from the given time the difference in time between the two places.

(c) To find the difference in time when the difference in longitude is given, divide the difference in longitude, expressed in degrees, minutes and seconds, by 15. The quotient will be the difference in time expressed in hours, minutes and seconds.

(d) To find the difference in longitude when the difference in time is known, multiply the difference in time, expressed in hours, minutes and seconds, by 15. The result will be the difference in longitude expressed in degrees, minutes and seconds.

(e) Since the sun seems to move from east to west, sunrise will occur earlier at all points east and later at all points west of any given place. Clock-time, therefore, will be later in all places east and earlier in all places west of a given meridian. See STANDARD TIME.

ILLUSTRATIVE PROBLEM. When it is noon at X, a town whose longitude is 71° 3′ 25″ west, what is the time at Y, longitude 2° 20′ 20″ east?

71°	3′	25″ W.
2°	20′	20″ E.
73°	23′	45″, difference in longitude.

15 | 73° 23′ 45″

4 hr. 53 min. 35 sec., difference in time.

Since one of the two towns is west and the other east of the principal meridian (at Greenwich), the difference in longitude (that is, the distance they are apart), is found by taking the sum of their longitudes (Rule *a*). This difference is equivalent to 4 hours, 53 minutes, 35 seconds of time; the time difference is found by dividing the longitude difference by 15 (Rule *c*), and the divisor 15 is used because 1 hour of time is equivalent to 15° of space.

Since the town Y is east of the town X, the time at Y is found by adding the 4 hours, 53 minutes, 35 seconds to the time at X (Rule *c*), making the time at Y 53 minutes, 35 seconds past 4 P. M. Likewise X is west of the meridian at Greenwich and Y is east of it; Y then has later clock-time than X (Rule *e*).

PRACTICE PROBLEMS. 1. Find the difference in time between—

New York, 74° 3′ W., and Berlin, 13° 23′ 53″ E.

Montreal, 73° 35′ W., and Paris, 2° 20′ 22″ E.

When it is 4 A. M. at Washington, 76° 56′ W., what time is it at Berlin, 13° 23′ 53″ E.?

2. Find the difference in longitude between two places whose difference in time is—

(*a*) 5 hr. 12 min. 18 sec.

(*b*) 6 hr. 18 min. 8 sec.

3. A vessel sailed from a port directly on a line of latitude for a certain distance, then turned and went due north to port. Here the captain found his watch to be an hour slow. In what direction did he sail first, and how many degrees?

4. A man travels until his watch is 1 hr. 20 min. fast. Does he go east or west, and how many degrees? B.M.W.

LONG PARLIAMENT, *par′li ment.* The last Parliament of Charles I well deserved this name, for it assembled in November, 1640, continued without interruption until 1652, and was not formally dissolved until March, 1660. It is, however, more celebrated for what it brought to pass in English history than for its length. It abolished the hated Star Chamber (which see); impeached and executed Strafford and Laud, the king's highly-unpopular ministers; declared that tonnage, poundage and ship money could not be collected at the will of the king for his selfish purposes unless Parliament consented, and deprived certain courts of their self-assumed powers. Then, to make itself perfectly safe, it passed a bill forbidding the king to dissolve Parliament without its own consent. But when these important matters were disposed of, the body found time and pretexts for violent squabbling, and at length an open break occurred between the members on the subject of the control of the army sent to suppress an insurrection in Ireland. The Cavalier party withdrew and held true to the king, against whom the Parliament waged successful war.

But religious differences sprang up. The Presbyterians of Parliament endeavored to put down the Independents, who were supreme in the army, and the result was that in 1652 the army expelled the ninety-six Presbyterian members and left what has since been known as the "Rump Parliament." It was this little body of about fifty men which put to death Charles I and established the Commonwealth. Cromwell found the Rump determined to hold on to its power at any cost, and therefore expelled its members in 1653, but in 1659, after Cromwell's death, they reassembled, the Presbyterians again joining the ranks. This resurrected body ordered a new election and dissolved itself on March 16, 1660.

Consult Gardiner's *The Great Civil War;* Firth's *Oliver Cromwell and the Rule of the Puritans in England.*

Related Subjects. The reader is referred to the following articles in these volumes:

Charles (England) — Cromwell, Oliver
Commonwealth of England — Restoration, The

LONG′STREET, JAMES (1821-1904), an American general, who was considered one of the hardest fighters in the Confederate army. His soldiers affectionately called him "Old Pete." He was born in South Carolina. After graduating from West Point, he gave his first service to his country in the Mexican War. During the War of Secession he took an active part in the battles of Bull Run, Williamsburg, those around Richmond, Fredericksburg, Gettysburg, Chickamauga and the Wilderness. In 1862 he was made a major-general in the Confederate army. After the war he filled several important government positions. President Hayes appointed him minister to Turkey, and in 1898, President McKinley made him United States Commissioner of Railroads, a post which he held at the time of his death.

LONGUEUIL, *loN geh′y′* or *loN′gay′y′,* the county town of Chambly County, Quebec. It is on the south bank of the Saint Lawrence River, opposite Montreal, with which it has ferry connection. Longueuil is served by the Quebec, Montreal & Southern Railway, and by the Montreal & Southern Counties, an electric line. It is a popular summer resort and residential suburb for Montreal business men. It has a Roman Catholic college and two convents. The principal industrial establishment is the branch plant of Armstrong-Whitworth & Co., the famous makers of armor plate and ordnance. Population in 1911, 3,972; in 1916, nearly 5,000.

LOO-CHOO, or **LU-CHU,** an archipelago in the Pacific Ocean, consisting of fifty-five islands lying between Japan and the island of Formosa, with a total area of 934 square miles. The most important island is Okinawa, on which the capital, Shuri, is situated. The southernmost islands are of coral formation; those in the north are of volcanic origin. The climate is pleasant and healthful, the soil fer-

tile and well cultivated. Sugar is extensively exported, and sweet potatoes, rice, beans, barley, wheat and vegetables of many kinds are cultivated. The islands possess a strong and sturdy breed of ponies, and pigs are raised in great numbers.

The inhabitants are similar to the Japanese, with mild and courteous manners, and the total population is estimated at 453,500. The Loo-Choo Islands were incorporated into the Japanese Empire in 1879, China having renounced all claims to them by treaty in 1874.

LOOKOUT MOUNTAIN, a tall, narrow plateau of the Lookout Mountain range, 1,700 feet in height, about three and one-half miles southwest of the city of Chattanooga, Tenn., and the site of a national park. It is famed for the Battle of Lookout Mountain which was fought there.

SUNSET ROCK
Lookout Mountain.

Battle of Lookout Mountain, a battle of the War of Secession, fought on Lookout Mountain, November 24, 1863, between the Confederate forces under General Bragg and the Federals under General Grant, and sometimes called *The Battle above the Clouds.* It was one of the three encounters in the Battle of Chattanooga. See CHATTANOOGA, BATTLE OF.

LOOM. See WEAVING.

LOON, the popular name for the DIVER, which see.

LOQUAT, *lo'kwaht,* the fruit of an evergreen shrub which is a native of China and Japan and has been introduced into subtropical climates throughout the world. In its natural state the tree attains a height of twenty feet, but when cultivated seldom exceeds twelve feet. It has large, wrinkled leaves, with pear-shaped, yellow fruit of a pleasantly-acid flavor and about the size of a small plum. It flourishes in the Gulf states and in California; in the latter state several greatly-improved varieties have been produced. The fruit ripens in the very early spring. The loquat industry in the United States is of little commercial importance, averaging a few thousand boxes a year valued at about $8,000, the greatest yield coming from California; but the yield is slowly increasing. The loquat is cultivated to some extent in conservatories.

THE LOQUAT

LORAIN, *lo rane',* OHIO, a city in Lorain County, and a shipping port of Lake Erie, situated at the mouth of Black River, about twenty-five miles west of Cleveland. It has a fine harbor with more than six miles of dock frontage, has regular boat service, and is on the Baltimore & Ohio, the New York, Chicago & Saint Louis and the Lorain, Ashland & Southern railroads. The Lake Shore Electric road connects with Cleveland, Lorain, Sandusky and other cities. Population, 1910, 28,883; in 1916, by Federal estimate, 36,964.

An agricultural country surrounds the city, and it is in a region of natural gas. It is the shipping point for the Central Ohio coal fields, and exports large amounts of coal, lumber, iron ore and grain. An extensive shipbuilding plant, steel works, foundries and automatic-shovel and stove works constitute the chief industrial establishments. The city has a Carnegie Library and Saint Joseph's Hospital.

A Moravian mission in 1822 preceded the first permanent settlement. In 1836 the place was incorporated as the village of Charleston; the name was changed in 1874, and Lorain was chartered as a city in 1896.

LORD'S PRAYER. This is the name commonly applied to the familiar prayer which might perhaps more correctly be called the "Disciples' Prayer." For Jesus taught it to His followers as an example of the proper manner of prayer, and with its petition of "forgive us our trespasses" it is by no means a prayer which the Lord himself needed to utter. Nor did He intend that His disciples should use just this form and no other; He wished rather to indicate the elements which should appear in every true prayer—the recognition of the greatness and majesty of God, the plea for the establishment of His kingdom, and the request for spiritual and temporal aid.

The Lord's Prayer appears twice in the Gospels: in *Matthew* VI, 9-13, and in *Luke* XI, 2-4. The two versions are not identical, but there

are certain signs in the originals which indicate to scholars that the slightly-differing forms were derived from one manuscript, and are not, as earlier critics held, reports of two distinct utterances of Jesus. The following is Matthew's form of the prayer, as it appears in the authorized and the American revised versions:

AUTHORIZED

Our Father which art in heaven,
Hallowed be thy name.
Thy kingdom come. Thy will be done in earth
as it is in Heaven.

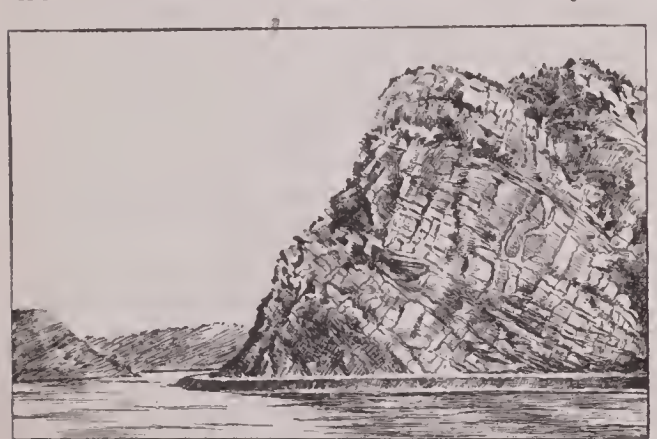
Give us this day our daily bread.
And forgive us our debts, as we forgive our
debtors.
And lead us not into temptation, but deliver us
from evil.
For thine is the kingdom, and the power, and the
glory, for ever,
Amen.

REVISED

Our Father who art in Heaven,
Hallowed be thy name.
Thy kingdom come. Thy will be done, as in
heaven, so on earth.

Give us this day our daily bread.
And forgive us our debts, as we also have for-
given our debtors.
And bring us not into temptation, but deliver us
from the evil one.

LORELEI, *lo're lie,* a rock about 430 feet high, on the right bank of the Rhine River near Saint Groar. It is famous in song and story for its remarkable echo, which gave rise to the legend that the rock was the home of a siren who lured mariners to destruction by her beautiful voice. As the vicinity of the Lorelei was a dangerous spot for navigation, the legend was easily believed by early peoples. The myth is the subject of a poem by Heine and of an incomplete opera by Mendelssohn.



LORELEI ROCK

The fading light grows dimmer,
The Rhine doth calmly flow;
The lofty hilltops glimmer
Red with the sunset's glow.
—Translation from *The Lorelei.*

LORIMER, *law'ri mer,* GEORGE HORACE (1868-), an American editor, journalist and story writer. His *Letters of a Self-Made Merchant to His Son* have been called a "modern Poor Richard's Almanac," and it was fitting that he should be called to the editorship of the paper founded and edited by Benjamin Franklin, the present *Saturday Evening Post.* Lorimer was born in Louisville, Ky. After graduating from Yale he accepted a position with Armour & Co. in their packing house at Chicago. Pork packing not appealing to his literary tastes, he resigned to engage in newspaper work. After several years' work in the journalistic field, Mr. Curtis, of *The Saturday Evening Post,* made him editor of that weekly magazine (1899), and it was for that periodical that Lorimer wrote the *Letters of a Self-Made Merchant to His Son,* which were afterwards published in book form. The *Letters* were very popular, as was also his *Old Gorgon Graham,* a second series of the *Merchant* letters. Both of these volumes are full of forceful maxims of the business world. Lorimer's admirable discrimination in selecting writers of fiction has helped to give the *Post* a foremost rank.

LO'RIS, an animal of the lemur family, native to Southern Asia, sometimes called the *slow lemur,* on account of its sluggish movements. It is about the size of a small cat, and has large, round eyes, soft, yellowish-gray fur and a broad, flat head with a white stripe between the eyes. It has no tail, and the toes are webbed together at the base. The loris sleeps in the daytime, rolled up in a ball with its head between its thighs and its feet clasped around the limb of a tree. It prowls around at night in search of food, which consists of young leaves and tender shoots, fruits, insects, birds and their eggs. See LEMUR.

THE LORIS

LORRAINE, *lo rane'.* See ALSACE-LORRAINE.

LORY, *lo'ri,* a group of Australian parrots, noted for their showy plumage, in which bright scarlet, green, blue and yellow are the dominant hues. The lory has a soft tongue with a brush-like surface, which indicates that its food is chiefly pulpy fruits, honey and plant juices, instead of the hard nuts and seeds which comprise the food of the common parrot.

NORTH FROM CENTRAL PARK

LOS ANGELES, *lohs ang' gel es,* or *los an' jel es,* CAL., according to the census estimates of 1916, was in that year the largest city in the United States west of Saint Louis. It is the county seat of Los Angeles County, and is situated 484 miles southeast of San Francisco and 781 miles southwest of Salt Lake City. The city's growth in population is proof of an unusual combination of natural advantages. In 1850 it was a town of 1,610 inhabitants. By 1890 the population was 50,395, and during the next ten years it had more than doubled, reaching 104,266. Another decade saw this figure increased to 319,198. In 1914 the United States estimate was 438,914; July 1, 1916, Los Angeles was estimated to have 503,812 inhabitants. It is the largest city in the Union having no saloons; they were voted out in November, 1917. In April, 1918, the city and surrounding country experienced an earthquake shock, without severe loss.

Situation and Transportation. Los Angeles is in Southern California, fifteen miles directly east of the Pacific Ocean and ten miles south of the Sierra Madre Mountains. The course of the Los Angeles River is through the city, but the stream is dry the greater part of the year. The site of the city is generally level, interrupted by occasional steep hills; the suburban residence sections, however, extend into the foothills. A wide strip of land eighteen miles in length connects the main city with its harbor, which is on San Pedro Bay. By the annexation of the ports of Wilmington and San Pedro and other additions, the area has been increased from 106 square miles, as reported by the Federal census of 1910, to 287 square miles. Chinatown, and a Mexican community about the old Plaza Park, once the center of the town, are now in the north part of the city.

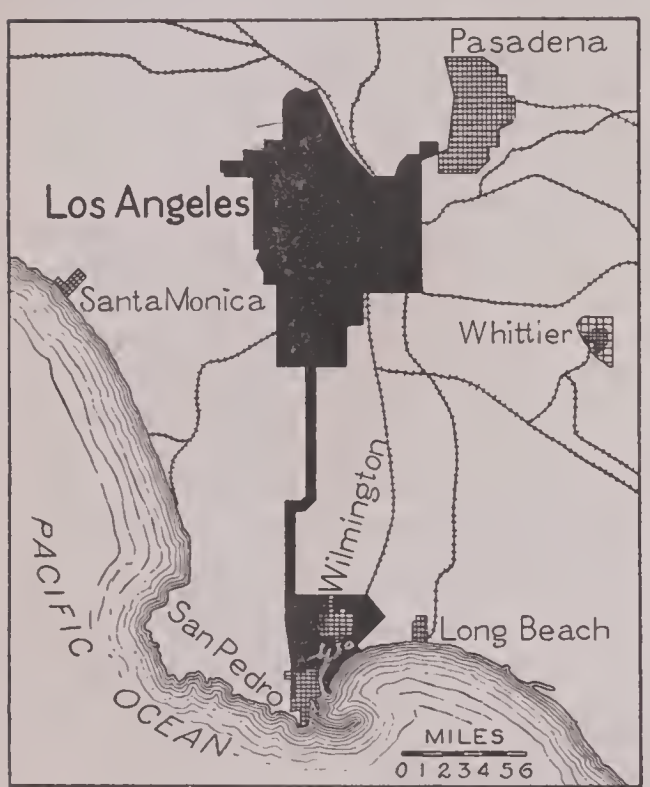
Los Angeles harbor has a possible water frontage of twenty-one miles. The Federal government has expended $3,100,000 upon the construction of a breakwater and in dredging operations, and in 1916 the city applied an additional sum of $10,000,000 to the greater development of the harbor, the building of municipal wharves and the construction of a broad transportation highway to the city. The Federal government is to construct an extensive system of fortifications on a bluff overlooking the harbor. With the completion of the Panama Canal, Los Angeles became a shipping point and port of call of first importance. Water commerce is rapidly increasing, and steamship lines operate from Los Angeles to San Francisco, Portland, Seattle and British Columbia, to Honolulu and the Orient, and through the Panama Canal to Atlantic and European ports.

The overland railroads running to Los Angeles are the Atchison, Topeka & Santa Fe; the Southern Pacific; the San Pedro, Los Angeles & Salt Lake, and the Chicago, Rock Island & Pacific. Perhaps no other American city has developed such an adequate system of street railways and electric interurban lines; the city lines comprise over 400 miles of single track; the interurban lines, double track, and many of them having four tracks, form a network throughout the country extending to places of interest and to numerous towns, some of them sixty miles distant.

Parks and Resorts. The entire Los Angeles County is really a great park, set between the Pacific and the snow-capped mountains, beautified by a semitropical vegetation, including orange groves, flowering shrubs and plants, pepper, palm, eucalyptus, acacia, banana and camphor trees. The city parks, with a combined area of over 4,000 acres, represent a combination of landscape gardening and this luxuriant natural vegetation. Near the business center, and bordered by a number of prominent buildings, is Central Park, one block square. Grif-

fith Park (3,015 acres), a wooded and hilly tract north of the city, is the second largest municipal park in the United States. The city has also Eastlake Park, near which is an alligator farm, aviary and aquarium, and Westlake, Echo, Elysian and Hollenbeck parks. Exposition Park contains a state exposition building; a museum of history, science and art, and the Seventh Regiment Armory, and, with its improvements, is valued at $3,000,000.

The automobile boulevards of the city extend throughout the county, becoming a part of the excellent system of state roads. Among the city's greatest attractions are the beach resorts, which include Santa Monica, Ocean



LOCATION MAP

Park, Venice, Redondo Beach, Long Beach and Catalina Island, and numerous suburbs, among them Hollywood, Alhambra, Pasadena and Universal City, the latter a municipality devoted to the moving-picture business (see MOVING PICTURE, subhead *Picture-Producing Plants*).

Buildings and Institutions. Los Angeles is preëminently a city of beautiful homes. Mission architecture, adapted from the Spanish, and the bungalow are characteristic types. The grounds surrounding private dwellings are exceptionally attractive. White is a prevailing color for private and public buildings, and retains its brightness because of the general absence of smoke in the city. Rows of potted palms are a unique feature of Broadway, one of the main business thoroughfares. Among the many prominent public buildings are the Federal building, erected at a cost of nearly $2,250,000, the county courthouse and hall of records, the city hall, the Bible Institute, erected at a cost of $1,400,000, Y. M. C. A. and Y. W. C. A. buildings (the first said to be the finest of its kind in the world), the public library, Temple Auditorium, Shrine Auditorium and Blanchard Art building. The Old Plaza Church, first built in 1822 and rebuilt in 1861, was the headquarters of General Fremont and contains interesting relics of early days.

Los Angeles is the seat of the University of Southern California (Methodist Episcopal), and of Occidental College (Presbyterian); it also has a state normal school, the McClay College of Theology, Saint Vincent's College (Catholic), military academies, girls' schools and many other private schools, art and music academies, etc. There are more than forty hospitals and a number of asylums.

Commerce and Industry. Los Angeles is the market for one of the richest horticultural and agricultural districts in the United States, and the chief products exported are oranges, lemons, olives, walnuts, vegetables, grain and cotton. The deciduous fruits are also preserved, canned or dried for export. Many acres are devoted to the cultivation of flowers, shrubs and bulbs for Northern and Eastern markets. In 1913 the oil fields of California produced 97,788,525 barrels of petroleum; the richest fields are in Los Angeles and adjacent counties. The manufacture of by-products, asphalt, lubricants, distillate and illuminating oil, is important, and petroleum is used as fuel by the railroads and by manufacturers.

Los Angeles is the center and headquarters for the rich mining fields of Southern California, Lower California, Sonora, Mex., and Arizona, and a large territory in Southern Utah and Nevada. Mineral products include gold and silver, borax, clay, gypsum, granite, cement and lime. Important industries are oil refining, meat packing, and the manufacture of steel and iron, mining machinery and supplies and lumber. Tuna fish is prepared by several canneries at the harbor. The value of manufactured products of Los Angeles for a single year is estimated at $120,300,000. More than 15,000 people are engaged here in the production of motion pictures and the annual output is valued at $20,000,000.

The city is a port of entry; the annual value of imports from foreign countries averages $4,160,000, and the value of exports $2,900,000.

The value of lumber, the chief domestic import, is about $6,000,000. The leading exports are fruits and vegetables, wine and brandy, hides, wool, honey, canned goods, sugar, cotton, wheat, corn, petroleum and by-products.

History. A group of colonists from Mexico, under the command of a government official, made a settlement at Los Angeles in 1781 for the purpose of raising produce for the soldiers of the presidios. San Gabriel Mission, now surrounded by the town of Alhambra, had been founded a few miles east about ten years earlier. The little pueblo was named Pueblo de Nuestra Senora la Reina de Los Angeles (City of Our Lady, the Queen of the Angels), a title suggested by the church calendar. Until 1847, Monterey and Los Angeles were alternately the capital of the Mexican province of California.

MAP OF THE LOS ANGELES AQUEDUCT

Los Angeles was taken by United States troops under General J. C. Fremont, in 1846, and was retaken by General Philip Kearny in 1847, after an uprising of the inhabitants. In 1851, the year after California entered the Union as a state, Los Angeles was chartered as a city; its rapid development began after the completion of the Santa Fe Railroad in 1885.

One of the most remarkable projects undertaken by the city, completed in 1913, was the building of the longest aqueduct in the world, which brings the melting snows of Mount Whitney to Los Angeles, a distance of over 250 miles. The total cost, including the preliminary work of constructing roads and trails, a telephone system, a broad-gauge railroad over the Mojave Desert, and power-generating plants, was about $25,000,000. The capacity is 258,000,000 gallons delivered at the outlet every twenty-four hours. The water power is used to generate electrical energy for manufacture, and the surplus water of the aqueduct is used for irrigation purposes at various points along the course.

LOSSING, *los'ing,* BENSON JOHN (1813-1891), an American who won fame as an historian, but who was first a watchmaker, editor and wood engraver. He was born in Bickman, Dutchess County, N. Y., was apprenticed to a watchmaker in Poughkeepsie in 1826, and in 1835 became editor of the Poughkeepsie *Telegraph.* Afterward he settled in New York as a wood engraver and illustrated his own writings. In 1841 appeared his *Outline History of the Fine Arts.* His *Pictorial Field Book of the Revolution* appeared in 1850 and 1852, being issued in numbers. He was also the author of a series of school histories. Other published works include *Life and Times of Philip Schuyler, The American Centenary, Compendious History of the Commonwealth of New York* and *Encyclopedia of United States History.*

LOTI, *lo te',* PIERRE (1850-), the pen name of LOUIS MARIE JULIEN VIAUD, a French novelist, whose early books, halfway between fact and fiction, portray not only his own life but also the spirit of modern literature in his own country. He was born at Rochefort of Huguenot ancestry, and at the age of seventeen entered the marine service. He traveled extensively until 1910, when he was placed on the reserve list, having been made captain four years before. As a naval officer he visited many ports, obtaining varied settings for his numerous books. The first of these, called *Aziyadé,* appeared in 1876, and told of his love for a beautiful slave girl in Constantinople. His most characteristic novel, *Mon frère Yves,* describing the life of a French bluejacket, won him great fame in 1883; his love of description rather than dialogue is best shown in his most popular novel, *Pecheur d'Islande,* which was written three years later and depicts the life of the Breton fishermen.

LOTTERY, *lot'er i,* a public gambling scheme for raising money by the distribution

of prizes by lot or chance. In the commonest variety of lottery, numbered tickets are sold to the public, prizes being awarded to such as hold numbers corresponding to those on duplicate slips drawn from a wheel or other receptacle. Before the legitimacy of this form of raising money was seriously challenged, most modern countries resorted to its use to increase their revenues. In America, in the eighteenth century, it was used to raise funds for the erection of public buildings of all kinds, including even churches. Money was so raised for the restoration of the famed Faneuil Hall in Boston after its destruction by fire in 1761.

The latest lottery to flourish in America with government support was the Louisiana State Lottery, which by the terms of its charter yielded $40,000 annually to the state. In 1890 Congress withdrew from this corporation the use of the mails and forced its removal to Honduras. Four years later another act of Congress prohibited the importation of lottery tickets or advertisements and placed heavy penalties on the sale of lottery tickets. In Cuba, Mexico and other Spanish-American countries lotteries are yet conducted under state protection.

LO'TUS. Of the many different plants which bear the name of lotus, probably the most widely known is the Egyptian water lily, whose large white or rose-purple flowers and wide-spreading leaves are familiar sights along the margins of the Nile and neighboring streams. The blossoms, which are sometimes a foot in diameter, are borne on a weak stalk from four to eight feet in height, from which they rise only a little above the surface of the water. The sacred lotus of the Hindus and Chinese is also a member of the water lily family.

A closely-related American species, known variously as the *water chinquapin, lotus* and *yellow water lily,* is found in abundance only in five places in the United States. The largest bed, in Grass Lake, Northern Illinois, about fifty miles northwest of Chicago, is a compact mass of flowers covering about 600 acres, a wonderfully-impressive sight in August. There are other beds near New York City, at Monroe, Mich., and Southern California and near Beardstown, Ill., on the Illinois River; in the latter bed the flowers do not grow in a mass, but are spread out along the stream for several miles.

The name lotus is applied most properly to a member of the pea family, a native of the temperate regions of Africa and Asia. There are about eighty species, and the flowers, which resemble those of the pea in shape and size, are white, yellow, red or purple. Important species are the bird's foot trefoil, the winged pea and the coral gem, which grows in the Canary Islands. The green pods of the winged pea are sometimes eaten as a substitute for green beans, and the ripened beans are used as a substitute for coffee.

The lotus is the national flower of the Hindus and Egyptians. A particular species of the

In that dark land of mystic dream
Where dark Osiris sprung,
It bloomed beside his sacred stream
While yet the world was young;
And every secret Nature told,
Of golden wisdom's power,
Is nestled still in every fold,
Within the lotus flower.
—WINTER: *A Lotus Flower.*

plant, no longer found growing in Egypt, was reproduced by the ancient Egyptians in their picture writing (see HIEROGLYPHICS) and in works of art.

The Lotus-Eaters. In ancient Greek legends, the lotus-eaters, or *lotophagi,* were a race of people who dwelt in Libya, on the northern coast of Africa, and whose sole food was the fruit and blossoms of the lotus tree. This plant, which has been identified as the *jujube* tree, possessed the magical property of causing anyone who ate of it to forget his homeland and the ties of friends and family. Tennyson thus describes its effects in his poem, *The Lotus-Eaters:*

Branches they bore of that enchanted stem,
Laden with flower and fruit, whereof they gave
To each, but whoso did receive of them,
And taste, to him the gushing of the wave
Far, far away did seem to mourn and rave
On alien shores; and if his fellow spake,
His voice was thin, as voices from the grave;
And deep asleep he seemed, yet all awake,
And music in his ears his beating heart did make.

In Homer's *Odyssey* it is told that Ulysses and his companions were entertained by the lotus-eaters on their return from the siege of Troy (which see). Three of the company partook of the "enchanted stem," and over them stole a languorous feeling, which made them desire to remain in that pleasant land and feast there forever. When Ulysses saw the dreamy, vacant expression in their eyes, he bore them forcibly away to his ships and forbade his other followers to taste of the magic food of that land "where it was always afternoon."

In modern speech the name lotus-eater is applied to the absent-minded, impractical person who aimlessly builds air castles and dreams dreams that can never come true.

LOUBET, *loo bay',* Emile (1838-), a French statesman and former President of the republic, was born at Marsanne, in the department of the Drome. He studied law in Paris and practiced in Montelimar and in 1870 was chosen mayor of that city. In 1876 he was elected to the Chamber of Deputies and in 1885 to the Senate. He joined the Tirard Cabinet as minister of public works in 1887, and in 1892 became Premier. On the sudden death of President Faure in 1899 he was elected President of France on the first ballot. His patriotism and simplicity of manner made him a popular President, and under his administration the country prospered. His term expired in February, 1906, and he was succeeded by Fallières. See France, subtitle *History of France.*

LOUIS, *loo'is,* or *loo'i,* the name of a famous line of French kings. The reigns of the last three covered some of the most troubled periods of the history of the country. Those in whom interest largely centers are the following:

Louis IX [Saint Louis] (1215-1270), the son of Louis VIII and Blanche of Castile. He was but twelve years of age when his father died and he succeeded to the throne, but his mother showed much wisdom and virtue as regent, and trained him to become a worthy king. Throughout his reign, indeed, he proved himself to be swayed by piety rather than by selfish ambitions.

In 1243 he was victorious in various engagements against the English, and in 1248 he set out in connection with one of the Crusades to the Holy Land, in pursuance of a vow made four years earlier during a critical illness. Failure attended his efforts, for he was captured by the Moslems and released with the remnant of his army only after the payment of a huge ransom. He remained for some time in Palestine, attempting to better the conditions of the Christians there, but in 1252 returned to France and devoted himself to the improvement of his country. He managed to increase the royal power at the expense of that of the great nobles, but at the same time was so just and kindly that he won the respect and love of all his vassals.

In 1270 he set out on a second crusade, but a plague broke out in the army while it was encamped in Tunis, and the king died. Twenty-seven years later he was canonized by Pope Boniface VIII. The Sieur de Joinville, who accompanied Louis on his expeditions, wrote a *History of Saint Louis,* which is the chief source of information as to the life of this monarch who was able and just in a day when ambition and intrigue betrayed the interests of most countries.

Louis XI (1423-1483), the son of Charles VII, and known as "the terrible king." Even before his father's death he had proved his vicious character, for he took part in various insurrections and was at length forced to flee from the kingdom. In 1461 he succeeded to the crown, and at once set himself to breaking down the power of the great nobles and strengthening his own. This he accomplished by the most high-handed means. If a noble opposed him he had him put to death, or thrown into a prison from which he never emerged. Indeed, it is said that the number of secret murders he had performed approached 4,000.

He acquired Provence, Maine and Anjou, and determined that the great possessions of the Duke of Burgundy must belong to the Crown. A long struggle with Charles the Bold was the result, and when Charles fell in battle Louis seized most of his territory and refused to surrender it to the rightful heirs. He was a pattern of the true despot, ruling without the States-General and levying taxes at his own discretion. Nevertheless, he benefited his country by his encouragement of art, learning and manufactures; established a postal system; opened roads and canals, and made it easier for the poorer classes to obtain justice. He was

religious and superstitious, and utterly despised the trappings of royalty; but royalty in France owed perhaps as much to him as to any of its kings.

Louis XII (1462-1515), the son of Charles, Duke of Orleans. He headed insurrections against Charles VIII, and was defeated and thrown into prison, but was restored to the throne. His chief ambition was to gain possession of Milan, to which he laid claim by descent, and several times he led an army into Italy. For a time the French were victorious, but in 1512 they were defeated and driven out of Italy; and in the next year they were defeated by Henry VIII of England in the Battle of the Spurs. According to the treaty concluded in 1514, Louis took as his third wife Henry's sister, Mary, but he did not long survive his marriage.

France was prosperous under Louis, who, while he had no great virtues and little force of character, was gentle and kindly, and won from his subjects the title of "Father of His People." He left no male heirs and was succeeded by his son-in-law, Francis I.

Louis XIII (1601-1643), the son of Henry IV and Marie de Medici. He succeeded to the throne on the assassination of his father in 1610, but as he was a minor his mother acted as regent, and this position she retained until 1617. The young king was given practically no education, and when he came to the throne allowed himself to be dominated by one favorite after another. In 1624 Cardinal Richelieu entered the Council, and from that time on the reign was that of Richelieu rather than of the king. Louis might have thwarted his great minister many times, but he appreciated his genius and loyalty, and always gave him support.

The destruction of the political power of the Huguenots, the strengthening of the royal authority and the weakening of the influence of the Hapsburgs were the work of Richelieu and not of the king. By his wife, Anne of Austria, Louis had two sons, the elder of whom succeeded as Louis XIV, who became known to the world as the "Grand Monarch."

Louis XIV (1638-1715), called the GRAND MONARCH, and THE GREAT, was looked upon as the perfect type of an absolute monarch. His exclamation, *L'etat c'est moi* ("I am the state"), not only shows his character but accurately describes the conditions of affairs in France in his time. Louis was a monarch for seventy-two years, a longer time than any other ruler in the history of the world, although Victoria of England, who ruled sixty-four years, enjoyed longer responsible reign.

He was the son of Louis XIII and Anne of Austria, and became king when but five years of age. His mother and her great minister, Mazarin, during the early years held the supreme power, and exercised it in a way to make the administration very unpopular. The troubles of the Fronde arose and were with difficulty put down, and twice the court was obliged to flee from Paris. Little attention was paid to the king's education and little was known about his character, and thus it came as a surprise when on the death of Mazarin in 1661 he declared that he would henceforth be his own chief minister. He kept his word. Recognizing ability in others, he chose wise counselors, whose work in some instances, as that of Colbert with the finances, was of the utmost importance; but no matter how many brilliant men he gathered about him, Louis was always the dominating figure. He surrounded himself with all the gorgeous trappings of royalty, and his court remains famous as an example of all that is splendid. His wife, the Infanta Maria Theresa of Spain, had little influence over him, but he was swayed by a succession of mistresses until he came under the influence of Madame de Maintenon, whom he married secretly in 1685.

His Conquests. Louis's greatest ambition was for foreign conquest, and his subjects, who during the early prosperous years of his reign regarded as perfectly right anything which their sovereign wished, entered enthusiastically into his plans. A valid reason for aggression was never necessary to Louis—if he wished a certain territory he could always find basis for a claim to it. Attacks on the Spanish Netherlands began in 1667, and by the war with Spain which followed he gained French Flanders. Alliances of German states against France followed, and these were constantly changing until at the outbreak of the War of the Spanish Succession they took definite form as the league under the leadership of William III of England, which finally succeeded in defeating Louis's ambitious plans.

Alienated Protestantism. The great mistake which Louis made in the administration of public affairs was his attitude toward the Huguenots, culminating in 1685 in the revocation of the Edict of Nantes. This was disastrous for France, not only because it drove from the country many of the most prosperous and industrious citizens, but because it finally alienated the Protestant countries of Europe, nota-

bly England. Indeed, the latter years of Louis's reign were as unfortunate as the early period had been splendid. Colbert's reforms had been temporary only, and the country was plunged into debt, while the utter complaisance of the people toward their king had been destroyed. Louis's reign marks the height of French power and influence; in art, in literature, in war and in statesmanship, France stood supreme. After Louis's death the downfall was rapid.

Louis XV (1710-1774), the great-grandson of Louis XIV. He came to the throne when but five years of age. Philip, Duke of Orleans, a man of ability but of licentious life, acted as regent during his minority, and the court at which the young king grew up ruined a character which seemed to have elements of worth. His reign of almost sixty years was one of the greatest factors in bringing about the French Revolution.

In 1723 Louis was declared of age, and in the same year was married to Maria Leszczynska, daughter of the dethroned king of Poland. The Duke of Orleans died soon afterward, and after a brief period, during which the Duke of Bourbon was prime minister, Cardinal Fleury, Louis's tutor, was placed at the head of affairs. He did France one service in improving the financial condition, which had become most deplorable during the years of the regency, but he was too old to give France a commanding place in the politics of Europe.

When Fleury died in 1743 the king attempted to follow out the policy of his great predecessor and rule without a minister, but he lacked Louis XIV's force and ability, and his reign was a calamity to France. By the War of the Polish Succession, undertaken to replace the exiled king on the throne, France gained Lorraine, but that was the last achievement of the reign. The War of the Austrian Succession, in which France was the ally of Prussia, gained nothing, and the Seven Years' War, fought also in America under the name of the French and Indian War, upon which Louis entered as the ally of Austria and the enemy of England, cost France India and Canada.

These unsuccessful wars laid heavy debts upon the country, but the money spent for them was not so begrudged by the people as was that showered upon the king's mistresses. These women were the real rulers of the kingdom. For twenty years Madame de Pompadour dictated policies and appointed ministers, and she was succeeded by the equally famous Madame Du Barry. For his failure to achieve any results in war, for the scandals of his life, for all that he cost France, Louis XV, who at the beginning of his reign had won the title of "the well beloved," came to be detested. He realized the condition into which he was plunging the country, but in his cynical words, "After us, the deluge!" expressed his utter indifference and his willingness that his successor should pay the penalty. He was succeeded at his death by his grandson, Louis XVI.

Louis XVI (1754-1793), the grandson of Louis XV, whom he followed in 1774. He had been brought up at the court of his grandfather, but had avoided its viciousness and remained all his life a moral and religious man. His character, however, was far from kingly, for his one great passion was for hunting, and he was little interested in statesmanship or in public affairs.

Four years before his accession he was married to Marie Antoinette, daughter of Maria Theresa. While at first he cared little for her,

THE MOST FAMOUS OF THEIR LINE

she came in time to exercise a dominating influence over him, for Louis was weak, unable to deal with conditions in a troubled time, and the popularity which his good nature won for him at first speedily died.

The first question to be met was that of finance, and for the first two years of Louis's reign that was ably handled by Turgot. The privileged classes, the nobles and the higher clergy objected to Turgot's reforms as making

demands on them, and in 1776 Turgot was replaced by the popular Jacques Necker. The aid given to the United States in the Revolutionary War laid a great burden of debt upon France, and Necker's methods in attempting to lift this angered the nobility, who demanded his resignation. In sanctioning this and in appointing to the vacant position the wasteful Calonne, Louis lost entirely the sympathy of his people, who began to demand far-reaching reforms. Necker was recalled in 1788, and suggested the convening of the States-General, which accordingly met in the following year. This event marked the opening of the French Revolution, and during the remaining years of his life Louis's history is a part of that movement. He pretended to sympathize with the revolutionists, but at the advice of his wife really opposed them, and as a result was taken prisoner with his family and brought from Versailles to Paris, where he was lodged in the Tuileries.

In 1791 the king and his family attempted to flee from France but were arrested and brought back. Although he promised to rule as a constitutional monarch the radicals were not satisfied, and a formidable invasion of the Tuileries took place in August, 1792. The king took refuge with the Assembly, and in the next month the Convention deposed him and declared France a republic. In December Louis was brought to trial for treason against the state, and though he defended himself with the greatest dignity was found guilty and on January 21, 1793, was guillotined.

Louis XVII (1785-1795) was king in name only. He was the son of Louis XVI and Marie Antoinette, both of whom died on the guillotine, and became Dauphin on the death of his elder brother in June, 1789. When his father and mother were made prisoners in the Temple in 1792 the little prince was confined with them, and the treatment shown him was harsher than that accorded others; for he was separated from his mother and given into the care of a cobbler named Sinim, who treated him with systematic cruelty.

On June 8, 1795, at the age of ten, he died, his death having been brought about by abuse and neglect; and at once there grew up a whole mythology of stories about him. Many people refused to believe that it was really the prince who had died, holding instead that he had been stolen out of the Temple and was in safekeeping somewhere. And in the years that followed numerous impostors arose claiming to be the lost prince. In all, there were no less than forty of these, though only two or three told stories which were not obviously absurd and untrue. A Prussian named Naundorff aroused the most interest, and there are those still who actually believe that he was the Dauphin. The latest pretender was Eleazer Williams, an Indian missionary born in the state of New York. He professed to have no memory of his early years, but brought forward claims which deceived many. Historians are, however, practically united in believing that the little prince did die in the Temple, or that if he was removed he died very soon afterward.

Louis XVIII (1755-1824), the "Restoration king of France," a brother of Louis XVI. He supported his brother in all his reactionary measures, showing no understanding of the real condition or necessities of his country. When Louis XVI attempted to escape in 1791 the Count of Provence, as his brother was called, fled with him and succeeded in getting across the frontier. The proclamations constantly issued from the court which he set up at Coblenz had the effect of enraging the people against Louis XVI and hastening his execution. On the death of Louis XVII the Count of Provence assumed the title of king, and during the Napoleonic period he traveled from country to country of Europe, finally settling in England.

In 1814, after the downfall of Napoleon, he ascended the throne, but showed himself far from liberal; and the enthusiastic reception which Napoleon met with on his return from Elba proved that the restored monarchy was not popular. He fled from Paris during the Hundred Days, but was again declared king after the Battle of Waterloo.

He lacked the insight or the force to take a positive stand in his policies, and succeeded in disgusting all parties in the state by his passive temperament. One thing, however, he had proved—that prosperity and content were not to be brought back to France by the restoration of the Bourbon monarchy. A.MC C.

Consult Farmer's *Versailles and the Court under Louis XIV;* Haggard's *Louis XVI and Marie Antoinette;* Hall's *The Bourbon Restoration.*

Related Subjects. Further information as to the history of France during these reigns will be found in the following articles:

Bourbon	French and Indian Wars
Crusades	French Revolution
Dauphin	Fronde
Du Barry, Countess	Hapsburg, House of
France, subtitle *History*	

Henry VIII (England)
Huguenots
Maintenon, Marquise de
Marie Antoinette
Mazarin, Jules
Medici
Nantes, Edict of
Necker, Jacques
Richelieu, Cardinal
Seven Years' War
States-General
Succession Wars

LOUIS I (778-840), called THE PIOUS, or LE DEBONNAIRE, was king of the Franks and Roman emperor, the third son of Charlemagne. His elder brothers died before his father, and he succeeded to the throne of the empire in 814, upon the latter's death. He was not without ability, but possessed none of the force which had characterized his father, and which was necessary in the government of so loosely organized a state. Trouble began in 817, when he divided his empire among his three sons, thus antagonizing his nephew Bernard, who felt himself entitled to Italy. In the insurrection which followed Louis captured Bernard and put him to death but suffered so from remorse that he entered a monastery for a time.

His first wife having died, he married in 819 Judith of Bavaria, who bore him a son, and by his desire to redistribute his possessions so as to provide for this fourth son he roused the jealousy of the other three, and the remainder of his reign was but a series of civil conflicts. Twice Louis was deposed and reinstated and he died before the struggle ended.

LOUISA, *loo e'za,* AUGUSTE WILHELMINE AMALIE (1776-1810), queen of Prussia, in whose honor the Prussian *Order of Louise* was founded, was born at Hanover. In 1793 she was married to the Crown Prince of Prussia, who afterwards ruled as Frederick William III. Her beauty, dignity and benevolence, together with the resolute and patriotic spirit she displayed during the wars with Napoleon, made her one of the most popular queens of history.

The story of the adoption of the cornflower, or *Kaiserblume,* as Germany's national flower, dates back to Queen Louise. This interesting story is told in these volumes under FLOWERS, subtitle *National Flowers.*

LOUISBURG, *loo'is burg,* a town on Cape Breton Island, Nova Scotia, once a great fortress, the chief stronghold of the French in America, now a fishing village of a thousand people. The town is on the Atlantic side of the island, about twenty-five miles southeast of Sydney, and though unattractive to settlers is admirably located as a fishing-station and as a fortress. Its splendid harbor, two and a half miles long and one and a half miles wide, is never ice-bound. After the French, by the Treaty of Utrecht in 1713, ceded Acadia to England, they still clung to Cape Breton Island. They hoped to keep it to guard the entrance to the Saint Lawrence River, and also to use it as a possible base of operations for the recovery of Acadia at some future time. On the rocky southeast shore they planted a great fortress, which they named Louisburg in honor of their king. For twenty-five years they labored over it, until it was considered impregnable. It became the resort of French privateers and fleets, and was a constant menace to the English colonies to the south.

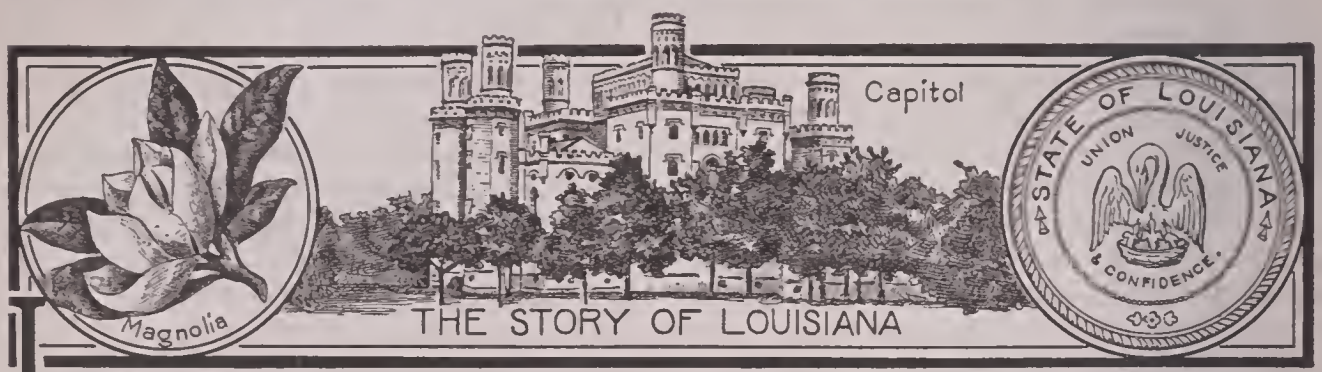
First Siege of Louisburg. After the outbreak of King George's War, in 1744, the colony of Massachusetts equipped an expedition to attack Louisburg. The undertaking seemed little short of madness, for Louisburg was as strong as human ingenuity could make it. Nevertheless, a force of nearly 4,000 men, commanded by Colonel William Pepperell, set sail in a fleet of a hundred vessels, and was joined by ten English ships-of-war under the command of Commodore Peter Warren. The combined forces began the siege on April 30, 1745, and on June 17 the fortress surrendered. By the treaty of Aix-la-Chapelle in 1748 Louisburg was restored to the French.

Second Siege of Louisburg. For ten years the French held Louisburg unmolested. They rebuilt parts of the town destroyed in the siege of 1748, and greatly strengthened the fortifications. In 1758, however, in the third year of the French and Indian Wars (which see), it again fell to the English, in whose hands it remained. At the time it was garrisoned by 3,000 French soldiers, and in the harbor was a French fleet manned by as many sailors. There were only three possible landing-places for the attackers. The English, under the command of General Amherst (see AMHERST, JEFFREY), attacked all three places at once. The main attack was led by James Wolfe at Freshwater Cove, the position farthest from the town. Wolfe's men forced a landing, and the French, in danger of an attack in the rear, abandoned their positions and withdrew into the fortress. English batteries were set up back of the town and on the farther side of the harbor, and the French fleet was set afire by a bomb. Hopelessly surrounded, the French finally surrendered. See FRENCH AND INDIAN WARS.

LOUISE, *loo eez',* LAKE, called the "Pearl of the Canadian Rockies," is accounted the most exquisite small bit of scenery in the world. Lying at an altitude of 5,645 feet, in the romantic "Lakes in the Clouds" region, it mirrors

in its pale blue waters all the changing, elusive colors of sky and clouds, dark forests and cliffs, and towering glacier-robed mountains. "A jewel dropped from heaven," one writer calls it, and another refers to it as "a liquid sapphire set in a diadem of silvered peaks." It is a quiet, tranquil lake, whose serenity is the more striking by contrast with the grandeur of the mountains, precipices and somber forests that encircle it. It is so shut in by mountains that winds do not ruffle its surface.

No spot of the Canadian Rockies is visited by more tourists than Lake Louise. It is in Alberta, thirty-four miles northwest of Banff and about two miles from the Canadian Pacific Railway station at Laggan, and is reached by a carriage road two and one-half miles long, and by an electric railway. On its shore the Canadian Pacific Railway has built a magnificent château hotel, and those who visit the lake may take advantage of a large number of mountain trips by pony or carriage.



LOUISIANA, *loo e ze an'a,* a south-central state of the American Union, with the Gulf of Mexico as its southern boundary. The name reminds one of the early history of the region, for it is named in honor of Louis XIV, king of France. The name of Louisiana was originally given to the whole Mississippi Valley by the French explorer La Salle, who in 1682 took possession of this vast region in the name of his king. Louisiana is the only state in the American Union where the French established a permanent settlement, and for this reason many of its institutions and laws are different from those of other states. As its flower Louisiana has chosen the magnolia, which truly represents the character of its luxuriant and fragrant vegetation. Popularly Louisiana is known as the CREOLE STATE, and it has also been given the nickname of the PELICAN STATE. A pelican appears on the state seal.

Size and Location. With an area of 48,506 square miles, of which 3,097 square miles are water, Louisiana ranks thirtieth among the states. New York, which is about 700 square miles larger, is the state nearest to it in size. Louisiana covers only about a fifteenth as large an area as the Canadian province of Quebec, which, like itself, contains a large population of French descent. The state is irregular in shape; its greatest length from north to south is 280 miles, and from east to west is 290 miles. It has a coast line of about 1,500 miles.

Its People. In population Louisiana, with 1,656,388 inhabitants in 1910, ranks twenty-fourth among the states. The estimated population on January 1, 1917, was 1,843,042. It had in 1910 an average of 36.5 persons to the square mile as compared with an average density of 30.9 for the whole of the United States. Of the population in 1910, 941,086, or 56.8 per cent, were white, and 713,874, or 43.1 per cent, were negroes, as against 52.9 per cent whites and 47.1 per cent negroes in 1900. The percentage of the negro population has been steadily decreasing. In the number of its negro inhabitants it ranks sixth among the states, South Carolina having a slightly larger number and North Carolina a smaller number than Louisiana.

A large proportion of the native white population is of French origin, being the descendants of the former French settlers of this region. Of the white population in 1910, 112,777 were of foreign or mixed parentage, and 51,782 were foreign born. During the last years there has been a strong immigration of Italians into Louisiana, and forty per cent of the foreign-born population of the state in 1910 came from Italy. Nearly 30 per cent of the people of the state live in cities and towns, and the urban population is larger here than in any other Southern state. This is due to the fact that New Orleans contains nearly one-fifth of the total population of Louisiana. Other principal cities are Baton Rouge, the capital; Shreveport, Lake Charles, Alexandria, Monroe, New Iberia, Crowley, Jennings, Opelousas, and Saint Martinville. The most important are described under their title in these volumes.

Religion. In contrast to the other Southern states, where the population belongs largely to the Protestant churches, more than half of the people of Louisiana are Roman Catholics. The remainder belong mainly to the two dominant Protestant churches of the south, namely, the Baptists and the Methodists, in the order named.

Education. As in every state with a scattered rural population and a great number of negroes, there were until recently an insufficient number of schools, but these are increasing steadily, and their standard is rising. The education law voted in 1912 introduced many reforms. It gave wide powers to the state board of education, composed of the governor, the superintendent of public education, the attorney-general, and one citizen from each of the eight congressional districts, appointed by the governor for four years. The schools in each parish (a *parish* in Louisiana is the same as a *county* in other states) are under the direct administration of a parish school board composed of from five to ten members, elected for six years. The board appoints the parish superintendent, who must be a competent teacher. The state now possesses quite a number of high schools. Separate schools are provided for white and negro children.

At the head of the educational institutions stands the State University and Agricultural and Mechanical College, situated at Baton Rouge. Then follow Tulane University at New Orleans; Loyola University at New Orleans; the Industrial Institute at Ruston; the Southwestern Industrial Institute at Lafayette; and two normal schools for the training of teachers, one at New Orleans, and the other at Natchitoches. Among the institutions for the education of negroes are the Southern University, Straight University and Leland University, all three situated at New Orleans; Southern University and Agricultural and Mechanical College at Baton Rouge; and the Louisiana Academic and Industrial Institute at Alexandria. Some of these are maintained by various religious denominations.

Louisiana has the largest proportion of illiterates of any of the states of the Union. In 1910 there were 352,179 persons who could not read or write, representing 29 per cent of the population of ten years or over, as compared with 38.5 per cent in 1900. The percentage of illiteracy was 48.4 per cent among negroes, 24 per cent among foreign-born whites and 13.4 per cent among native whites. With a decrease in the proportion of negroes and better educational facilities, there is due very soon a vast improvement.

Charitable and Penal Institutions. The state maintains an institute for deaf and dumb, and another for blind children, both at Baton Rouge; insane asylums at Jackson and Pineville; a soldiers' home at New Orleans, and several hospitals. The state penitentiary is at Baton Rouge, and there is a house of detention at New Orleans. A reform school for juvenile offenders is situated at Monroe, and an industrial school and home for colored children is at New Orleans. At Angola, Hope and other places there are prison farms, where convicts are employed in agricultural work.

Physical Features. Louisiana is one of the lowest and most level states in the Union, its average elevation being only about seventy-five feet above the level of the sea. The surface slopes gradually from near the northern border, at Arcadia, where it reaches an altitude of 368 feet, to the sea. The southern portion is a coastal plain, extending inland for thirty to sixty miles, and is largely made up of marshlands, cut up by lakes and lagoons. In this coast region one often meets the so-called "trembling prairies," that is, land that trembles when men or cattle pass over it. These plains are formed of vegetable mold, which rests on water, peat or quicksands. To the north of this region is a broad prairie belt extending into Texas and bordered on the north by rolling forest lands. The land along the Mississippi and the other rivers consists of flat plains, that are usually situated below the level of high-water mark of the rivers, and are therefore exposed to floods. These flood plains, which extend in width from six to sixty miles, contain a soil of great fertility and are mostly occupied by large plantations of sugar cane, cotton and corn. They are protected against overflow of the rivers by artificial banks, or *levees,* of which there are now about 1,500 miles in Louisiana. The system of levees, which has been of such enormous benefit to the state, has been built almost entirely since the War of Secession, and represents an expenditure of nearly $50,000,000 for the original cost of construction alone.

Rivers. Louisiana has nearly 4,000 miles of navigable rivers. The chief river is, of course, the Mississippi, which flows through about one-half of the state, and borders the other half. The Red River crosses the state from the northwest and joins the Mississippi; while the Washita enters near the northeastern corner

OUTLINE MAP OF LOUISIANA

Showing the boundaries of the state, extent of navigable rivers, chief cities, location of gas fields and coal areas, and the highest point of land in the state.

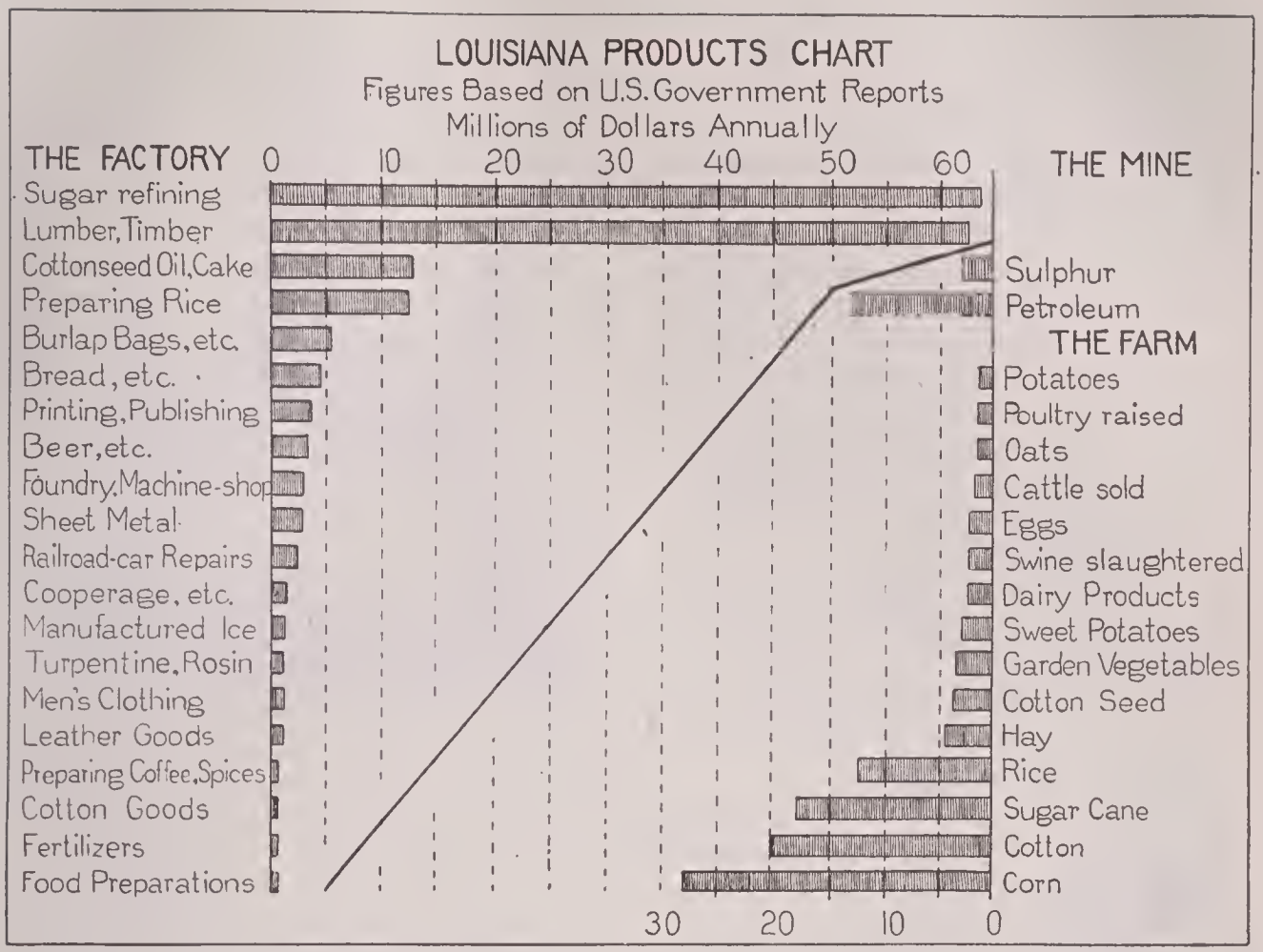
and flows southward to near the middle of the state before joining the Red River. The Sabine River divides Louisiana from Texas, and forms two-thirds of its western boundary, while the Pearl forms a part of its eastern boundary and divides Louisiana from Mississippi. The southern part of the state is traversed by numerous bayous, which are really secondary rivers, or flood outlets.

Louisiana contains many lakes. Those in the gulf plain on the south are but shallow arms of the sea, and their water is salt or brackish. Along the rivers there are numerous lakes, which are really lagoons that were formerly in river channels but have been cut off by changes in the course of the river. Such lakes are usually in the form of arcs of a circle, and are connected with streams.

Climate. Louisiana has a semitropical climate, but owing to the nearness of the Gulf and the winds that blow from that direction, the intense heat is tempered, and the climate is equable. The average temperature for January is about 60° F. in the southern part of the state, and 45° F. in the north, while in summer the thermometer may rise as high as 100° F. Frosts occur from the first of November until the first of March, but the temperature seldom reaches the zero point. The entire state has an abundance of rainfall, which is evenly distributed throughout the year, and averages sixty inches in the southern half and fifty inches in the north.

These climatic conditions favor a luxuriant vegetation, in which most of the warm temperate and many of the subtropical species grow. Of native flowers the commonest and best known are roses, water lilies, magnolias, hyacinths, camelias, oleanders and chrysanthemums.

Forests. Some of the finest and greatest forests in the United States are found in Louisiana. It is estimated that about 28,000 square miles, or over half of the total land area, are covered with forests. In this respect Louisiana is surpassed only by Idaho and the Pacific Coast states. Pines, both the long-leaved and short-leaved varieties, cover nearly forty per cent of the area under forests. In the southwest there is an extensive pine belt, of about 4,200 square miles, which contains the heaviest growth of long-leaved timber in the world. Since 1904 Louisiana has occupied first rank among the states in the yellow pine industry.



The swamp regions contain extensive and magnificent forests of cypress. Hardwood timber, represented by oak, cottonwood, red gum, magnolia, ash and hickory, is found throughout the state. As regards lumber products Louisiana now ranks second, being surpassed only by the state of Washington.

Agriculture. As this region has a fertile soil, a semitropical climate, and an abundant and well-distributed rainfall, it is only natural that agriculture should be the chief occupation of the people of the state. About one-third of the total land surface, approximating 29,061,000 acres, is included in farms, the average size of these being eighty-six and one-half acres. The average value of farm land per acre is $18, land in Louisiana having a slightly higher value than that in any other of the Gulf states.

Louisiana leads all the states of the Union in the production of rice and sugar cane, but corn and cotton are of equal or greater value to the state, and occupy a larger acreage. Rice has been grown here for many years, but its production has increased enormously since 1880, when new methods of cultivation were introduced. Nearly fifty per cent of the total production of rice in the United States is grown in Louisiana, and from twenty-five to forty per cent in the neighboring state of Texas. The entire region west of the Mississippi and bordering on the Gulf of Mexico, the center of which is Crowley, in Acadia parish, is now one extensive rice field. About 400,000 acres are under rice, and the yearly production averages more than 10,000,000 bushels. See the article Rice, for map of rice production in America.

Louisiana produces over seventy-five per cent of the sugar cane raised in the United States. The region situated around the lower part of the Mississippi, and generally known under the name of the "sugar bowl," is devoted to the cultivation of cane. The sugar plantations cover an area of over 500,000 acres, and the yearly production of cane is about 5,000,000 tons.

The cotton plantations cover over 1,000,000 acres, and Louisiana, with a yearly production of 400,000 bales, is usually ninth among the cotton-producing states, ranking after Oklahoma. The area planted to corn is steadily increasing, covering now over 2,000,000 acres; the yearly yield is about 40,000,000 bushels. Other important crops are oats, sweet potatoes, garden vegetables, hay and forage plants.

Many of the fruits of warm and semitropical lands, such as oranges, grown especially on the

coast, figs, grapefruits, peaches and pomegranates are produced here.

Animal Life. Among the wild animals native to the Gulf states black bears, wolves and deer are still found occasionally in Louisiana, and the lynx and panther may be seen on rare occasions in the swamp regions. Raccoons, squirrels and opossums are common, and the bird life is varied and abundant. Besides the familiar game birds, such as pelicans, cranes, turkeys, geese and partridges, there are many smaller feathered residents, some of which are clothed in charming and brilliant plumage. Alligators and numerous kinds of reptiles, including turtles, lizards, rattlesnakes and moccasins, are found in the swamp lands.

Live stock is made up chiefly of cattle, horses, mules, sheep and swine; the state has about 268,000 milch cows, 191,000 horses, 132,000 mules, 180,000 sheep, 1,412,000 swine. Louisiana produces each year about 32,702,130 gallons of milk, and the total annual value of its dairy products is nearly $3,000,000.

Fisheries. In the value of its fisheries Louisiana is second only to Florida among the Gulf states. The oyster fisheries are the most important, and are surpassed only by those in Chesapeake Bay. Other important catches are shrimp, catfish, trout and crabs. Alligators, caught for their hides, were formerly numerous, but are becoming scarce.

Minerals. The mineral resources of Louisiana have been worked only since the first decade of the twentieth century. Its chief products are sulphur, petroleum, salt, coal and natural gas. Louisiana produces nearly all the sulphur extracted in the United States, and one of the most important sulphur mines in the world is found at Sulphur City. The only other great source of supply in the world is the sulphur mines in Sicily (Italy). At Sulphur City large beds of sulphur that extend four to six hundred feet underground are found. A new and interesting method is used to extract the sulphur from these underground beds. Hot water is pumped down into these sulphur beds; this dissolves the sulphur. Then the water is brought up in pipes to the surface, where it is cooled in large tanks. The sulphur it contains in solution is thus deposited, leaving a product of remarkable purity. The value of the sulphur extracted yearly is nearly $6,000,000. The most valuable mineral product of the state is petroleum, and the oil fields here are a continuation of those in Texas. One of the richest oil regions in the United States is found around Jennings. Extensive oil fields are located in Caddo parish, in the north. In 1914 Louisiana produced over 14,000,000 barrels of petroleum. Natural gas has also been found in Caddo parish, and it is believed that this state is underlain by one of the greatest gas fields found in any part of the United States.

Rock salt is another mineral largely extracted here. Deposits of salt were first discovered at Petite Anse Island, in the coast swamp region, during the War of Secession, and these have been worked ever since. In some places this deposit is over 1,000 feet thick, and the salt is of remarkable purity.

Manufactures. The manufacturing industries of Louisiana have shown a steady and rapid growth. The value of the state's manufactured products in 1880 was only $24,205,000; since then it has increased tenfold, to over $250,000,000 yearly. Between 1899 and 1909 it doubled, and in the next five years increased a further fourteen per cent. This great development has been due to the discovery of the oil fields in Texas and in the state itself, which is supplying for its factories a cheap and handy fuel. The improvement of waterways and the building of railroads have also greatly helped this remarkable industrial activity. As is only natural, the products of its extensive cane sugar, rice and cotton fields and the timber of its primeval forests provide the raw material for the chief industries of the state.

The most important industry is the manufacture and refining of cane sugar and the manufacture of molasses. Louisiana ranks first among the states of the Union in this respect. The manufacture of cane sugar in the United States is confined almost exclusively to Louisiana, while it produces double the amount of molasses manufactured in all the other states. Next in importance comes the manufacture of lumber and timber products, over 700 establishments being engaged in this industry. The manufacture of cottonseed oil and cake comes next. This is followed by the cleaning and polishing of rice, Louisiana containing more than half of all the establishments in the United States engaged in this industry. The manufacture of bags, mostly from burlap, for handling cottonseed and rice, is also well developed.

Transportation. The navigable rivers make it possible for almost any part of the state to be reached by water, affording comparatively easy and cheap transportation. Railroad construction was begun late, and has been rather slow. The state had 5,225 miles of railroad,

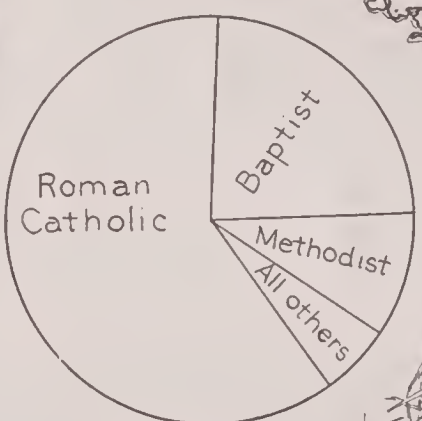
LOUISIANA

Jackson Monument
New Orleans

Congressional Districts

People per sq. mile by Decades

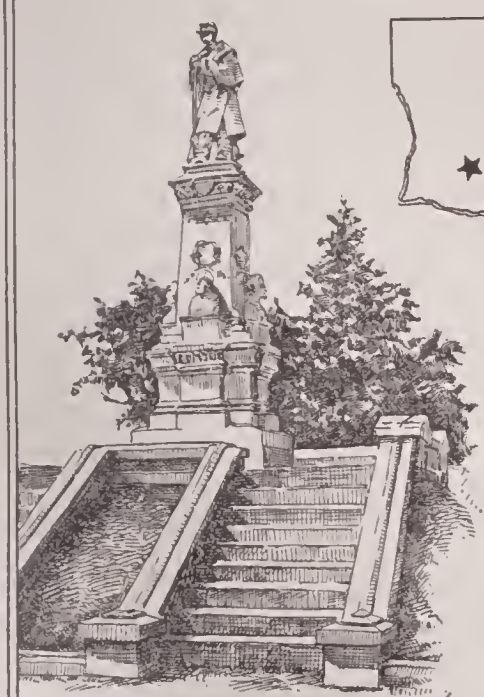
1810	1.6
1820	3.2
1830	4.4
1840	7.3
1850	10.3
1860	14.6
1870	15
1880	19.8
1890	23.1
1900	28.6
1910	34.1



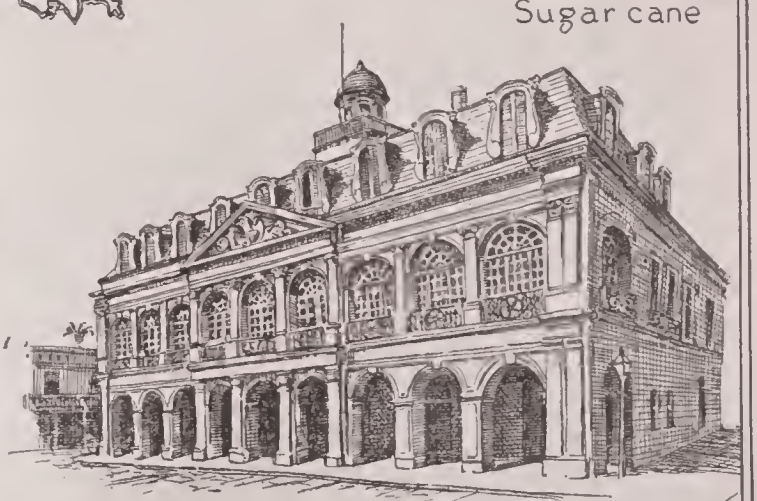
Religions

Center of rice production in U.S.

Sugar cane



Confederate Monument
New Orleans



Cabildo, Old Spanish Court, New Orleans

main lines and branches, in 1915. Several trunk lines traverse Louisiana from north to south and from east to west. The principal lines are the Southern Pacific; Texas & Pacific; Louisiana Railway & Navigation Company; Kansas City Southern; Illinois Central and Yazoo & Mississippi Valley; Chicago, Rock Island & Pacific, and Queen & Crescent Route. The great railroad center is New Orleans, which is also the chief river port and seaport. In the total tonnage and value of merchandise New Orleans is now the second port in the United States, coming after New York. A canal has been built from the Mississippi River to Lake Borgne, which greatly shortens the passage from New Orleans to the Gulf of Mexico. Louisiana has a railway commission of three members, who have control over and authority to fix rates on both rail and water routes. The state is divided into three railway commission districts, and each district elects one commissioner.

Government. Louisiana is governed under a constitution adopted in 1913. This is the ninth constitution the state has had since its admission to the Union in 1812. It has many political institutions and provisions that differ from those of other states. This is due partly to the attempt to harmonize its former laws and institutions with those of the American democracy, and partly to the problems connected with the possession of a large negro population.

The *executive* officials, the governor, lieutenant-governor, secretary of state, state treasurer, state auditor and attorney-general, are elected for four years each. All except the governor and state treasurer may be reëlected. The governor must be at least thirty years of age at the time of his election.

The *legislative* power is vested in a general assembly, which consists of a senate and a house of representatives. The number of senators must not exceed forty-one or be less than thirty-six, and the house of representatives must not have more than 120 members. The members of each branch are elected for four years. Sessions of the general assembly are held every two years, starting the second Monday in May in even numbered years, and are limited to sixty days.

Louisiana sends eight members to the United States House of Representatives.

At the head of the judicial power is the supreme court, consisting of one chief justice and four associate justices, each elected for twelve years. Below this there are twenty-two district courts, each with one judge elected by the people for a term of four years. There are, besides, courts of appeal, justices of the peace, and such other courts as may be created by law. The constitution of 1913 created a juvenile court at New Orleans and made provisions for the establishment of other such courts throughout the state.

For purposes of local government the state is divided into "parishes," which have here exactly the same meaning and function as counties in other states. This division into parishes dates from 1807, and is based on an earlier Spanish division of the province, made for religious purposes. This explains why so many parishes are named after saints. The general assembly has the power to establish new parishes, but no parish can have a smaller area than 625 square miles, nor contain fewer than 7,000 inhabitants.

Towns with more than 2,500 and cities with more than 5,000 inhabitants may adopt the commission form of government.

Suffrage. The conditions under which the franchise is granted in Louisiana differ from those prevailing in other states, and are of special interest. Every male citizen of the United States, twenty-one years of age or over, who has been an actual resident of the state for two years, of the parish for one year, and of the precinct in which he offers to vote for six months immediately preceding the election, is entitled to vote, if he satisfies certain other conditions. He must first show his ability to read and write either English or his mother tongue by filling out a form applying to be registered as a voter. This is known as the literacy test. In case he is not able to read and write he must show that he owns property of at least $300 in value.

The constitution also provides that no person under sixty years of age shall be permitted to vote unless he has paid a yearly poll tax of one dollar for the two years preceding the election in which he offers to vote. These provisions have been introduced in order to reduce as much as possible the number of negro voters, and they have proved quite successful, as very few negroes meet the required qualifications.

Law. The law system of Louisiana occupies a unique position, for it is the only one among the states of the Union that is not based on the English common law. When the province came into the possession of the United States in 1803, the Spanish laws were in force. But the majority of the people were of French descent and had strong French traditions, so when the famous Code Napoleon was introduced in France

RESEARCH QUESTIONS ON LOUISIANA

(An Outline suitable for Louisiana will be found with the article "State.")

Has the state which is nearest Louisiana in size a larger or a smaller population? How much?

What is the purpose of Louisiana's levees? What was the cost of their construction?

How does Louisiana rank among the states in the production of cotton? About how many bales does an acre yield?

What is the chief port of the state? How does this city rank among the ports of the United States as regards value of merchandise entering and clearing?

What is the significance of the state name? Give two popular names. What is the state flower?

What are "trembling prairies," and where are they to be found? What is the highest point in the state?

Is this higher or lower than the highest point in Illinois? In Florida?

Of what two very important substances does Louisiana produce larger crops than any other state in the Union?

Of what manufactured products does this state make more than half of all that is produced in the United States?

Has Louisiana more or fewer inhabitants to the square mile than the country as a whole? If the province of Alberta were as thickly settled, what would its population be?

What are *bayous?* Where do they occur in this state?

What part of the state is known as the "sugar bowl," and why is it so called?

To what division of other states does the parish of this state correspond? Why are so many of the parishes named after saints?

How does it happen that there is a larger city population in Louisiana than in any other Southern state?

How were the lakes in the southern or coastal plain region formed? How were the lakes along the rivers formed?

How many of the Gulf states surpass Louisiana in annual value of fisheries? What is the most important of the sea foods?

If an inhabitant of Louisiana cannot write enough to fill out his registration blank, what chance is there that he may vote?

How does the religious situation differ in this state from that in other Southern states?

In what important mineral product does Louisiana surpass all the other states of the Union combined? Where else is this same substance mined?

How is hot water used in mining in this state?

How does the civil law code in Louisiana differ from the codes of the other states? How do you account for this?

Why has the educational problem been a peculiarly difficult one? What steps have been taken toward solving it?

How many states produce more lumber than does Louisiana? What is its most valuable timber tree?

What substance that appears on your table at every meal is mined in this state in great quantities?

many of its provisions were incorporated into the laws of Louisiana (see CODE NAPOLEON). The United States government did not interfere, for it has always been its policy to leave to the people the task of making or changing their laws, as long as these do not conflict with the Federal Constitution or with the fundamental legal customs of the country. This explains why to-day the laws of Louisiana contain elements of both Roman and English law. Its civil law is almost entirely based on the French system, and is different from that in use in the other states, while its criminal, commercial and corporation laws are based on the English system.

Other Constitutional Provisions. Louisiana possesses a conservation commission that is charged with protecting the natural resources of the state. It adopted in 1906 a primary election law for the direct nomination of all state, parochial and municipal officers. An employers' liability law providing for the compulsory compensation of workmen in case of accidents was voted in 1914. Several acts dealing with the liquor traffic have been passed. It is an offense to sell or give away cocaine. Gambling on horse racing is prohibited. A period of ten hours constitutes a legal day's work. It is unlawful to employ children under fourteen years of age, while night work for boys under sixteen and girls under eighteen is also forbidden.

History. Louisiana is one of the regions of the United States that was visited quite early by explorers. In 1519 Alvarez de Pineda, a Spanish explorer, entered the mouth of the Mississippi and spent some time on its banks, and in 1541 the region was visited by De Soto. In 1682, La Salle descended the Mississippi River to its mouth, took possession of the entire country, and named it Louisiana, in honor of his king, Louis XIV of France. The first permanent settlement was made in 1699 by d'Iberville at Biloxi. In 1718 the Company of the West, organized by John Law, obtained the exclusive privilege of trade in Louisiana. New Orleans, which had been founded in the same year by Bienville, the governor of the colony, was made the capital in 1722. In 1733 the province came under the direct administration of the Crown. By the treaty of Paris, concluded in 1763, France ceded to Spain all that portion that lay west of the Mississippi, together with the city of New Orleans and the island on which it stood. By the same treaty it ceded to Great Britain all the rest of its possessions in America. The people of the province were not satisfied with this change, but eventually Spain established its rule. In 1800 Napoleon obtained back from Spain the ceded territory, and in 1803 he sold the province to the United States for $15,000,000 (see LOUISIANA PURCHASE). In 1804 the region west of the Mississippi was organized as the Territory of Orleans.

Progress as a State. In 1812, April 30, the Territory of Orleans, increased by the region east of the Mississippi and comprising the present area was admitted as the fifth new state of the Union after the original thirteen, under the name of Louisiana. In the War of 1812 New Orleans was attacked by the English and was bravely defended by about 5,000 men under General Andrew Jackson. In 1852 the capital was moved from New Orleans to Baton Rouge.

Louisiana passed the ordinance of secession on December 23, 1860, and in 1861 it ratified the Confederate Constitution. New Orleans was occupied by Union forces in May, 1862, and a military government was established. The state suffered severely from the cessation of its commerce. During the period of reconstruction Louisiana was the scene of long-continued strife, and bloodshed was frequent. Military occupation came to an end in 1868, after Louisiana had adopted a constitution enfranchising the negroes, and after it had ratified the Fourteenth Amendment to the Federal Constitution. The great mass of the white population was slow to reconcile itself to the new conditions.

By what was known as the "grandfather clause" in the constitution of 1898, and by the conditions required to exercise the privilege of voting laid down in the constitution of 1913, which are described above (see SUFFRAGE), the political predominance of the whites has been assured.

In 1884 the New Orleans Exposition was held to celebrate the hundredth anniversary of the first shipment of cotton from New Orleans. Since the beginning of the twentieth century the progress of the state in material wealth, educational conditions, and social legislation has been steady and rapid. O.B.

Consult Thompson's *The Story of Louisiana;* Cox's *Explorations of Louisiana;* Phelps' *Louisiana,* in American Commonwealths' Series.

Related Subjects. The following articles in these volumes will be of interest in connection with a study of Louisiana:

CITIES

Alexandria	Monroe
Baton Rouge	New Orleans
Lake Charles	Shreveport

HISTORY

De Soto, Fernando	La Salle, Sieur de
Grandfather's Clause	Louisiana Purchase
Iberville, Sieur d'	Reconstruction

PRODUCTS AND INDUSTRIES

Cotton	Pine
Forests and Forestry	Rice
Lumber	Sugar
Molasses	Sugar Cane
Oyster	Sulphur
Petroleum	

RIVERS

Mississippi	Sabine
Red	Washita

UNCLASSIFIED

Creole	Levee

LOUISIANA PURCHASE, the most important event of Thomas Jefferson's administration, by which the United States secured a vast region lying between the Mississippi River and the Rocky Mountains, and extending from the

LOUISIANA PURCHASE
An area over half as large as that part of Europe west of Russia. It cost the United States less than fifteen dollars per square mile.

Gulf of Mexico to the Canadian boundary. Out of this domain have been formed fourteen states, in whole or in part. In 1802 the government discovered that two years before Spain had been forced by Napoleon to cede to France the territory known as the province of Louisiana, the heart of the North American Continent. The news was disquieting, for France was a powerful nation, and the mouth of the Mississippi was a strategic point. To close the mouth of this river to United States trade meant to ruin the commerce of the western states bordering on the great river. When Jefferson heard of the acquisition of the province by France he wrote Robert R. Livingston, minister at Paris, to ask for New Orleans and the Floridas, or at least for the right of deposit (storage for American imports and exports) at New Orleans. If the request were refused, Jefferson, although a lover of peace, stood ready to declare openly against France, holding that the despotic control of the Mississippi was an act of deliberate unfriendliness. In such a case, the United States would at that time have become the ally of Great Britain in its war with France.

Napoleon was forced to recognize Great Britain's supremacy on the sea, and he felt the impossibility of holding the port of New Orleans against British attack. For this reason, more than for any friendliness toward the United States, Napoleon offered Livingston, not the Floridas or the minor right he had demanded, but the entire Louisiana province, a section of land which covered 1,172,000 square miles. At this point, James Monroe, sent by Jefferson as minister plenipotentiary in the crisis, closed the deal unhesitatingly. The land cost the United States $15,000,000. The transfer was made on April 30, 1803.

The act did not win Jefferson's unqualified approval. He held that there was nothing in the Constitution which provided for the acquisition of the land and advised a constitutional amendment, but the people overwhelmingly approved of the purchase, and the vote of the Senate stood twenty-four to seven in favor of it, so the province of Louisiana was annexed to the United States. The inhabitants of that territory came under United States protection, and special privileges of entry, to hold good for twelve years, were granted France and Spain.

Louisiana Purchase Exposition, an international fair held in Saint Louis, Mo., to celebrate the one-hundredth anniversary of the purchase of the Louisiana territory from France. It opened April 30, 1904, and continued until December. It was one of the greatest exhibitions the world had ever seen; forty-two states and fifty-three countries were represented. Fifteen buildings, in Renaissance architecture, were grouped in the form of a fan on a site in Forest Park. Four art buildings were the point of the fan. There were palaces of Education and Social Economics, of Mines and Metallurgy, of Liberal Arts, of Manufacture, of Varied Industries, of Electricity, of Machinery and of Transportation. The largest building was the Palace of Agriculture, which covered twenty-three of the 1,142 acres given to the site. There were also 500 buildings representing governments, states and special exhibits. France erected a copy of its Grand Trianon (the home of Marie Antoinette) of Versailles, and Louisiana's build-

ing was a reproduction of the New Orleans Cabildo, where the transfer of the Louisiana territory took place. Before the exhibition was opened to the public more than $20,000,000 had been spent. Total attendance was 21,000,000.

Consult Hitchcock's *The Louisiana Purchase and Exploration;* Hosmer's *History of the Louisiana Purchase.*

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, a state school whose history begins with government land grants made early in the nineteenth century. The university is the outgrowth of the Louisiana State Seminary and Military Academy, which was founded in 1853 near Alexandria, and opened in 1860 under the presidency of William T. Sherman, a prominent officer in the Union Army during the War of Secession. In 1869 the seminary was removed to Baton Rouge, where, in 1870, it became the Louisiana State University. In 1873 the Agricultural and Mechanical College at New Orleans was founded. In 1877 this school and the older one at Baton Rouge were merged into one institution, which was chartered under the present name. The university is organized into colleges of arts and sciences, agriculture and engineering, the teachers' college, the law school, Audubon Sugar School and a graduate department. At New Orleans, Crowley, Calhoun and Baton Rouge are agricultural experiment stations connected with the university. Tuition is free except to students of foreign countries, who pay a fee of $100. Many such students attend the university for the experimental courses offered in the Audubon Sugar School. The library contains over 37,000 volumes. There are ninety-eight instructors and student assistants, forty-two officers and experiment station and extension workers not included in the faculty, and over 1,650 students.

The Audubon Sugar School is the only school of its kind in the United States, and is believed to be unsurpassed in the world for training sugar chemists, sugar engineers and factory superintendents. The law school devotes more attention than usual to the civil law upon which is based the jurisprudence of Louisiana and the Latin-American countries. The university has for some years engaged extensively in activities outside of its walls, on the theory that a state university should, to some extent at least, serve all the people of the state instead of confining its efforts to those only who can attend its classes. For instance, the college of agriculture was one of the pioneers in organizing clubs of various kinds among the rural population; and the department of junior agricultural extension was the first to plan, construct and operate a combination of the automobile and the moving picture machine, by which moving pictures and lantern slides illustrating the work of the department have been exhibited in the most remote country districts T.D.B.

LOUIS PHILIPPE, *loo e' fe leep'* (1773-1850), king of the French, called THE CITIZEN KING, was born in the Palais Royal, Paris, and was the eldest son of Philippe Egalité, duke of Orleans. Favoring democratic principles at the outbreak of the French Revolution, he entered the national guard, rose to the rank of lieutenant-general and took part in the battles of Valmy, Jemappes and Neerwinden. He then became involved in the conspiracy of his chief, Dumouriez, against the republic, and was arrested, but escaped to Switzerland. In 1814 he returned to France and recovered his vast estates, which had been seized by the Imperial government. When the Revolution of 1830 ended with the abdication of Charles X, Louis Philippe was made lieutenant-general of the kingdom, and a week later was appointed to the vacant throne. During the eighteen years of his reign he was universally unpopular and in the Revolution of 1848 was forced to abdicate. He fled to Normandy and then to England, where he spent the few remaining years of his life.

LOUIS THE GERMAN (about 805-876), king of the Eastern Franks from 843 to 876, whose share of the empire of his father, Louis the Pious, formed the nucleus of modern Germany. Louis the Pious, son of Charlemagne (which see), had inherited the great empire of his father. Upon the death of Louis, in 840, a fierce dispute broke out among his three sons, Louis, Charles the Bald, and Lothair, each of whom was a claimant for the domains of his father. In 843, by the Treaty of Verdun, the empire was divided into three parts, Louis the German receiving the portion east of the Rhine (see VERDUN, TREATY OF). He thus became ruler of the German, or East Frankish, kingdom. During much of his reign he was engaged in warfare, as he was forced to defend his realm against the invasions of the Slavs and the Northmen, and to crush the revolts of his sons. In 870 he forced his brother, Charles the Bald, to sign the Treaty of Mersen, whereby the territories of Lothair were divided between the West and East Frankish kingdoms. His reign was much troubled by revolts of his sons.

LOUISVILLE, *loo'is vil,* Ky., the largest city of the state, and the county seat of Jefferson County. The population, which in 1910 was 223,928, had increased by 1916 to 238,910. The city is on the Ohio River, the north state boundary line; and is 130 miles by the river and 110 miles by rail southwest of Cincinnati. Frankfort, the state capital, is fifty miles east.

Louisville is served by the Baltimore & Ohio Southwestern; Chesapeake & Ohio; Chicago, Indianapolis & Louisville; Cleveland, Cincinnati & Saint Louis; Illinois Central; Louisville & Nashville; Louisville & Northern; Louisville, Henderson & Saint Louis; Pittsburgh, Cincinnati, Chicago & Saint Louis, and the Southern railroads. Electric interurban lines extend to neighboring cities and towns. Steamers from Louisville navigate more than thirty rivers, tributaries of the Ohio and the Mississippi, and connect with Memphis, Cairo, Cincinnati and many other river ports.

The city has an area of twenty-four square miles. It extends seven miles along the south shore of the river and is about sixty feet above low water, sufficiently high to be free from flood dangers. The falls by which the river descends twenty-six feet in the course of two miles, creating abundant power for manufacture, have given Louisville the name of "Falls City."

In order to make provision for navigation around the falls during low water, a canal two miles in length, built in 1830 and controlled by the Federal government since 1874, extends along the Louisville side of the river. Enlargements were begun in 1916 to accommodate an increased river commerce, and when completed the whole project will represent an expenditure of $9,000,000. Three steel bridges span the river, two between Louisville and Jeffersonville and one between Louisville and New Albany, two suburbs in Indiana. A lighthouse is maintained here by the Federal government and Louisville has the only inland life-saving station in the United States.

Parks. The parks of Louisville are noted for natural beauty and are so located as to be of greatest benefit to the citizens. Cherokee Park (330 acres) has six miles of macadamized roadway, golf links and tennis courts; Central Park has tennis courts and playgrounds; Iroquois Park (670 acres), a woodland of native forest and planted trees, has five miles of macadamized roadway; Shawnee, Fontaine Ferry and Riverview parks are on the banks of the river, and have bathing beaches and water amusements. An eighteen mile boulevard connects these and other parks and extends to the Kentucky state Fair Grounds (200 acres) and to the Government fish hatchery, southwest of the city. The Coliseum, on the fair grounds, cost $110,000 and seats 6,000 people. Churchill Downs and Douglas Park have well-known courses for the famous Kentucky sport, horse racing. Mammoth Cave, one of the natural wonders of the United States, is eighty-five miles by rail south of Louisville.

Public Buildings. Prominent buildings of the city are the courthouse, custom house and post office, city hall, the armory (a large convention hall seating 16,000 people), Y. M. C. A. and Y. W. C. A. buildings, the building of the *Courier-Journal,* and many fine hotels, banks and churches. Louisville contains a number of noteworthy monuments, one to the cause of the Confederacy, another to the memory of Zachary Taylor; and statues of Thomas Jefferson, Daniel Boone, Henry Clay and George D. Prentice, a former Louisville journalist. Abraham Lincoln was born fifty-four miles from Louisville, and a beautiful granite shrine marks the spot of his log-cabin home. Five miles east of the city is the old home and the grave of Zachary Taylor.

Institutions. Louisville has good educational advantages; its schools for higher education are the University of Louisville, with academic, medical and law departments; Louisville College of Pharmacy; Louisville College of Dentistry; Jefferson School of Law; Southern Baptist Theological Seminary; Presby-

terian Theological Seminary of Kentucky, and State University (colored). There are also the Louisville City Hospital Training School for Nurses and the Kentucky Institute for the Education of the Blind, which has in connection the American Printing House for the Blind (see BLINDNESS, subtitle *Education of the Blind*).

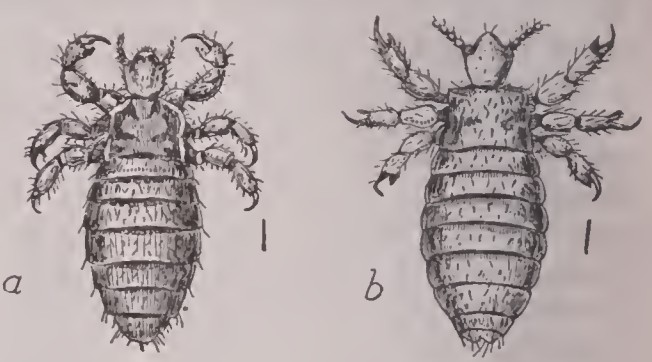
The Carnegie Public Library consists of a fine main building and eight branch buildings and has more than 160,000 volumes (1916). In the main building is an art gallery and a museum of rare collections of birds, plants, shells, relics and curios.

The new city hospital, which has cost $1,000,000, and the United States Marine, Saint Joseph's, the Norton, and Deaconess hospitals; the Masonic Widows' and Orphans' Home, Saint Joseph's Orphan Asylum (Roman Catholic), German Protestant Orphan Home and the Louisville Industrial School of Reform are the largest of many benevolent and charitable organizations.

Industries. Exceptional transportation facilities and rich agricultural surroundings have made Louisville one of the most important trade and manufacturing centers of the South. The value of its annual factory products exceeds $100,000,000. It is probably the largest leaf-tobacco market and tobacco manufacturing city in the world and handles more than one-third of the tobacco crop of the United States. It contains extensive manufactories of whisky, plows, wagons, boxes, bathtubs, flour, furniture, implements, leather, pianos, organs, cement, men's clothing, paint, etc. It is an important market and meat-packing center and has large drug, hardware and wholesale establishments.

History. The first settlement made at Louisville was on an island (now washed away) in the river. In 1779 a party of thirteen families under the leadership of George Rogers Clark, removed from the island to the mainland. The new settlement was named in honor of Louis XVI of France. It was incorporated as a town in 1870, chartered as a city in 1824 and rechartered in 1851, 1870 and 1892. In 1890 the city was swept by a tornado which caused the death of eighty people and a loss of $2,500,000. W.E.M.

LOUSE, *lous,* a parasitic insect that feeds on warm-blooded animals and upon plants. The common louse lives by sucking blood from man and other animals. It is a small, wingless insect, with flat, almost transparent body, hooked feet fitted for holding to hairs, and a beaklike sucker forming the mouth part, which, though soft, can pierce the skin so as to enable the animal to draw the blood. The eggs of lice are called *nits.* They are oval and are attached to hairs by a gummy substance. They hatch in six days and in eighteen days more are capable of reproducing. Personal cleanliness is the best preventive of both head and body lice, but these pests are easily transmitted from one person to another. Mercurial ointment is considered the best remedy for destroying the insects; the hair may often be rid of them by means of a kerosene wash.



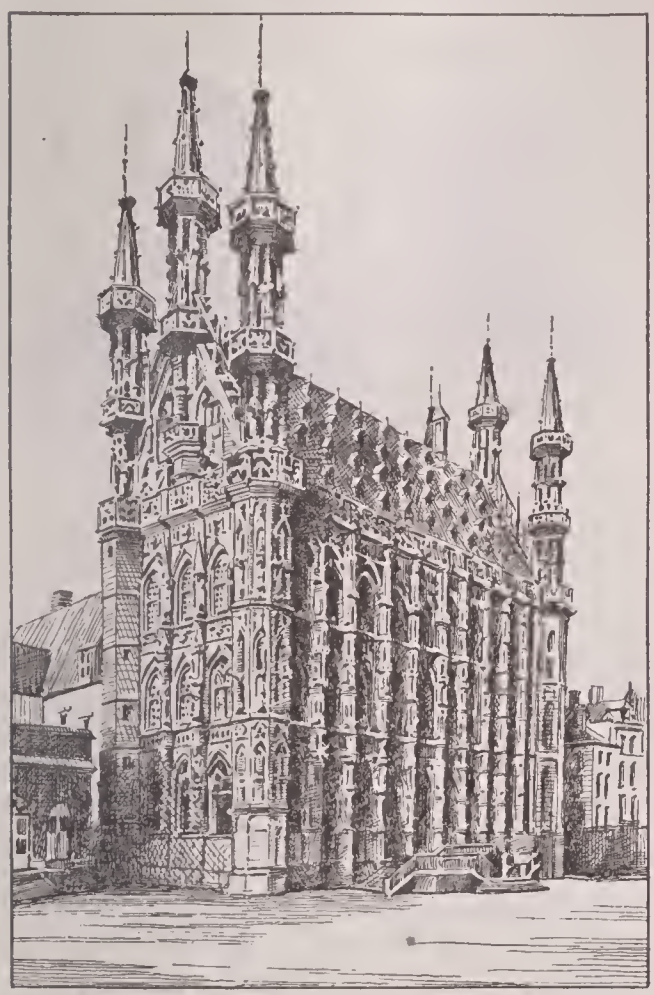
LICE WHICH ATTACK HUMAN BEINGS
(*a*) Head louse; (*b*) body louse. The perpendicular line at right of each shows adult size.

Three species are said to belong to man, several species to birds, one species lives in books or papers, and a winged species of bark louse clusters on the bark of trees.

LOUVAIN, *loo vaN',* a beautiful city in the Belgian province of Brabant, stormed and partly destroyed by the German forces during the first month of the War of the Nations (which see). This city, one of the quaintest memorials of the days of feudalism, is situated about eighteen miles east of Brussels on the Dyle River. Its famous church of Saint Pierre is in ruins, and nothing but the towers are left of its magnificent Gothic cathedral, ranking among the finest in Europe. Four other churches of the fourteenth and fifteenth centuries were also razed. Its beautiful town hall, the Hôtel de Ville, is the most important of the city's old landmarks now standing. Very little of the celebrated university, with its library of 250,000 volumes, is left to tell of the glory of former days.

Destiny decreed a tempestuous history for this little city of about 42,500 inhabitants. In the fourteenth century it was very prosperous, due to the enterprise of its cloth manufacturers. Then the weavers revolted against their rulers, and because of harsh treatment many fled to England. The plague of the sixteenth century again struck a severe blow at its prosperity.

However, by means of its industries, including the manufacture of lace, starch and chemicals, it recovered again, and flourished until the



HÔTEL DE VILLE, OR TOWN HALL
Passed safely through the German bombardment of August, 1914. The building was completed about the year 1450.

great war of 1914 left to its thrifty people only their determined spirit to rise once more, perhaps greater than ever, amid their city's ruins.

LOUVRE, *loo'vr',* PALACE OF THE, a group of magnificent buildings in Paris, containing the largest, and perhaps the most famous, collection of paintings in the world. The palace is an enduring memorial of French history, for the original building served as a strong castle in the Middle Ages, a mansion under Charles V and an elegant château under Louis XIV. Today the Louvre is the great art palace of the people of France. Its beginnings date from Philippe Auguste (1180-1223). Francis I, after 1541, erected that part of the palace which is now called the Old Louvre, and the buildings have been enlarged and adorned by successive kings, until little trace of the original structures remains.

The Museum of the Louvre bears testimony to the creative spirit of the French Revolution. It was opened in 1793, but its origin goes further back, as the kings of France were wont to use the Louvre as a storehouse for artistic treasures. When Napoleon came into power the pictures taken as the plunder of war from Italy, Germany and the Netherlands were installed in the Louvre. At one time half the masterpieces of Europe were in Paris, and although most of the works were later returned to their owners, many remained in the Louvre and are there now. Since Napoleon's time great paintings have continually been added to the famous collection, for the Louvre is the great national museum of the French nation.

Its distinction lies in its masterpieces of famous artists. Every school is represented by a wealth of studies from the brushes of its foremost representatives in art—old masters as well as the best of the modern schools. The Louvre also contains a fine collection of drawings and engravings. It is likewise rich in sculptures, including Greek and Roman, medieval and modern. The two greatest art treasures which have come down from antiquity, the sculptured figures *Venus de Milo* and the *Winged Victory of Samothrace,* are in the Louvre. Of nearly

THE LOUVRE

equal interest are the Egyptian and Asiatic antiquities and numerous antique paintings, vases, bronzes and ornaments.

Consult Van Dyke's *Paris: Critical Notes on the Louvre;* Bicknell's *Louvre.*

LOVE'MAN, ROBERT (1869-), an American poet, best known for the little poem beginning—

> It isn't raining rain to me,
> It's raining daffodils.

Breathing, as it does, the very spirit of spring, with its "buccaneering bee" and its "wild flowers on the hill," it has lent itself readily to musical setting, and has become very popular as a song. Loveman has published several books of poems, most of them very short

lyrics touching upon some phase of nature or life.

Loveman was born in Cleveland, Ohio, but has spent practically all his life in Dalton, Ga., and the South claims him as one of its poets.

LOW, *lo,* SETH (1850-1917), an American educator and statesman who effected radical reforms in all departments of city administration as mayor of New York, and who also improved the public school system. He was born in Brooklyn, N. Y., and was educated at Brooklyn Polytechnic Institute and Columbia College (now Columbia University). After being graduated from Columbia with honors he became a member of a tea-importing firm headed by his father, but was soon manifesting an active interest in public affairs. He organized and became the first president of the Brooklyn Bureau of Charities, was elected mayor of Brooklyn in 1881 on an independent ticket and was reëlected in 1883. In 1880 he was chosen president of Columbia College, and during his administration the institution was reorganized, the college was moved to its present location and the name changed to Columbia University. Mr. Low donated $1,200,000 for the erection of the library of the university (see COLUMBIA UNIVERSITY).

SETH LOW

In 1899 he was appointed by President McKinley as delegate to the Universal Peace Conference at The Hague. Two years later he was elected mayor of New York City on an anti-Tammany ticket, but was defeated for reëlection on a fusion ticket in 1903. In 1906 he bought 196 acres in Westchester County, New York, and engaged in experimental farming.

LOWELL, *lo'el,* ABBOTT LAWRENCE (1856-), an American lawyer and educator, best known as president of Harvard University. He was born in Boston, his family being one of the most distinguished in the history of Massachusetts. James Russell Lowell was his uncle. He was graduated from Harvard College in 1877 and from the Harvard Law School three years later. For seventeen years he practiced law in Boston, achieving a high position in his profession. In 1889 he had published a little volume, *Essays on Government,* which had attracted considerable attention, but his standing as a writer on government was established in 1897 by his *Governments and Parties of Continental Europe,* a work which is still standard in its field.

ABBOTT L. LOWELL

In the same year he was appointed a special lecturer on government in Harvard University and in 1900 was made a professor. At this time he also became trustee of the Lowell Institute in Boston, an institution founded by one of his ancestors for maintaining free public lectures on religion, science, art and literature. Lowell proved himself an able business man and administrator, and it is for this reason, probably, as much as for his reputation as an educator, that he was chosen president of Harvard University in 1909, to succeed Charles William Eliot. In 1910 he was elected a trustee of the Carnegie Foundation for the Advancement of Teaching.

Besides the works already mentioned, Lowell wrote a number of other books, the most important of which are *Colonial Civil Service* (in coöperation with H. Morse Stephens), *The Influence of Party upon Legislation in England and America,* and *The Government of England.* This last work is to England what James Bryce's *American Commonwealth* is to the United States; it confirms its author's position as one of the leading authorities on the science of government.

LOWELL, JAMES RUSSELL (1819-1891), an American poet, critic and diplomat, born February 22, 1819, at Elmwood, Cambridge, Mass. From the first he was favored by circumstances —favored, but not weakened. His home was beautiful, his family already distinguished in New England history, and his father a well-to-do minister, possessed of "a rare sweetness and charm." From his mother he inherited his wit and his love of poetry. His early education was not systematic, and was obtained largely in the ways that pleased him best—by wide reading and by constant contact with nature and with cultivated people. All his forefathers had been graduated from Harvard, but he neglected every study except literature

and almost failed to get his degree. That his literary ability was recognized by his classmates is shown by the fact that he was chosen to write the class poem—a thoughtless satire upon the Abolitionists which he published for private circulation.

JAMES RUSSELL LOWELL

In 1840 he was graduated from Harvard Law School, but his profession never really interested him, and while waiting for clients he wrote poetry. His genius was always somewhat indolent, requiring special causes to stimulate it, and love proved the inspiration of his first volume, which appeared in 1841. This little collection of more than ordinary lyrics was called *A Year's Life,* and was dedicated to Maria White, to whom he was betrothed. Her influence on him was strong, and led, after their marriage, in 1844, to his championing the cause of freedom. In 1843 he helped to found *The Pioneer,* a magazine which Poe, Hawthorne and other distinguished contributors failed to make popular. During the Mexican War he began his immortal *Biglow Papers,* a satire in Yankee dialect. The sly humor, the irony, the well-defined New England characters and the political philosophy set forth in trenchant form made the series immediately popular, and the author famous. Such expressions as "This goin' ware glory waits ye haint one agreeable feetur;" "You've gut to git up airly ef you want to take in God;" "I don't believe in princerple, but oh I *du* in interest," became household words.

In 1848 came his best-known poem, *The Vision of Sir Launfal,* which well shows the inspiration which the poet drew from nature and good deeds. The witty *Fable for Critics* appeared the same year, and with all its puns and satiric thrusts proved Lowell one of America's foremost critics. A visit to Europe in 1851, with his family, and one in 1855, after his wife's death, helped to fit him to succeed Longfellow as professor of modern languages at Harvard. As an instructor he was notably successful in making his students think and awakening them to an appreciation of the beauties of literature; and his teaching, together with his editorials, first in the newly founded *Atlantic Monthly* and, after 1864, in the *North American Review,* occupied much of his time. In 1857 he married Miss Frances Dunlap, with whom he lived happily for many years. In 1872 he again visited Europe, and received honorary degrees from Oxford and Cambridge universities.

Meanwhile he had published more *Biglow Papers,* and in 1865 produced his *Commemoration Ode* to the Harvard graduates who died in the war. He himself lost eight relatives in the conflict, and his heart was in the poem, which probably never has been surpassed by any of its kind. *Under the Willows,* issued in 1869, contains the verse of many years, including that called forth by the death of his wife. *The Cathedral* (1870) marks the height of his thought, while his *Memorial Poems* (1877) proved him the greatest American poet of patriotism, and practically closed his poetic career.

Lowell's writings had supported the Republican party, and he was a Presidential elector in 1876. In the following year President Hayes appointed him minister to Spain, and three years later transferred him to England. Lowell possessed remarkable executive ability and common sense, which might have won him fame in some international crisis, but none occurred, and he did little more than to strengthen mutual good will. His uprightness, learning, wit and brilliant oratory, however, made him a prominent man in England. In 1885 his wife died, and in the same year he was recalled to America. There he was still a public figure, for his mind remained vigorous, and no great occasion was considered complete without a word from him. His health grew more and more feeble, however, and on August 12, 1891, he died at Elmwood, where the greater part of his life had been spent. Most of his eminent friends had died before him, and he was buried in Mount Auburn cemetery, near Longfellow.

Lowell was of medium height, broad-shouldered and active. His hair and beard were of a chestnut color. His conversation was delightfully witty, yet always gave the impression, like his writings, of something still better to come. He much preferred writing to revising, yet was far from careless with his work, and never sacrificed future fame to temporary advantage or wealth.

His poetry is great because of its vigorous expression, its witty sayings and its sound common sense. It lacks the grace, evenness and

simplicity of Longfellow's verse, and the metrical perfection and musical quality of Poe's; it is crowded with allusions and with references to literature and hence is often hard reading. It well repays study, however. His chief prose

ELMWOOD
Lowell's Home at Cambridge.

works are *Fireside Travels,* which contains some delightful fancies and descriptions; *My Study Windows,* containing his descriptive and critical masterpieces which are perhaps best known; and *Among My Books,* two volumes which have placed him above all previous American critics. C.W.K.

Many quotations from Lowell have become well known; of these, the following may be cited:

They are slaves who dare not be
In the right with two or three.

Be noble! and the nobleness that lies
In other men, sleeping but never dead,
Will rise in majesty to meet thine own.

Before man made us citizens, great Nature made us men.

Talent is that which is in a man's power; genius is that in whose power a man is.

Consult Brownell's *American Prose Masters;* Greenslet's *James Russell Lowell: His Life and Work.*

LOWELL, Mass., one of the greatest textile manufacturing cities of the United States. It is one of the two county seats of Middlesex County, the other being Cambridge, and is situated in the northeastern part of the state, at the junction of the Merrimac and Concord rivers, seven miles from the New Hampshire state line. Boston is twenty-five miles southeast. Transportation facilities are provided by the Boston & Maine and New York, New Haven & Hartford railways, and interurban electric lines extend from the city in all directions. The population in 1910 was 106,294; a Federal estimate in 1916 increased the number of people to 113,245. Only twenty-five per cent of these are Americans. The area of the city is a little less than thirteen square miles.

Lowell is noted for the variety of its manufactures aside from its textile industry. The value of its combined products amounts to $80,000,000 annually, and its factories employ 39,000 people. Immense water power is furnished by the Merrimac River, which has a fall here of thirty-two feet, and by the Concord River. The Canal and Lock Company, organized to supply power to the cotton factories, furnishes water power to Lowell, where it is used extensively, as coal commands a high price. By means of its canals, Lowell develops about 30,000 horse power daily. The larger mills, however, are equipped with steam power machinery for use in dry seasons.

The city claims to have the largest cotton mill, the best textile school, the largest sailcloth factory and the largest hosiery mill in the United States. In one year it produces sufficient cloth to wind seven times around the world. For its product of leather, magnetos, proprietary medicines, mohair plush, phonograph needles and muslin underwear it enjoys a high rank, and in the manufacture of shoes its importance is rapidly increasing. Other products worthy of note are carpets, cartridges, machinery, tools, electrical goods and rubber goods. One of the most interesting things observable in Lowell is the interest displayed by manufacturers in the welfare of the industrial class. The city has an enviable record for labor conditions, and for its system for providing good homes and advantages for education, recreation and amusement. There are night schools, free reading rooms, a library with 90,000 volumes, four high schools which cost $1,600,000, four industrial schools, its excellent textile school, Rogers Hall for girls, and a state normal school. Besides its $500,000 city hall, it has a Federal building, Memorial building, the Ayer Home for Young Women and Children, and one for aged women, four hospitals and nearly eighty churches.

The original name of the city was Chelmsford. In 1822 the Merrimack Manufacturing Company established a cotton mill here and changed the name to its present one, in honor of Francis Cabot Lowell, pioneer in cotton spinning in the United States. The village grew rapidly. In 1826 it was incorporated as a town and in 1836 was chartered as a city. The

commission form of government, with a mayor and four commissioners, was adopted in 1912. Lowell is the birthplace of J. A. McN. Whistler, the artist, and his old home is now used as an art museum. Features of interest are monuments to Ladd, Whitney, Taylor and Colonel Ellsworth; the latter was the first Union soldier to fall in the War of Secession. J.H.M.

LOWER CALIFORNIA. See CALIFORNIA, LOWER.

LOW GERMAN. See PLATTDEUTSCH.

LOYOLA, *lo yo'la,* or *loi o'la,* SAINT IGNATIUS OF (1491-1556), a Spaniard who began life as a soldier and became one of the greatest of churchmen, winning undying fame as the founder of the Society of Jesus, better known as the Jesuits (which see). He was born in the castle of Loyola, near the little Spanish town of Azpeitia, and was christened Inigo Lopez de Recalde. The name by which he is known in history was assumed after he became a devotee of religion. As soon as he was old enough and had learned to read and write a little, he was sent as a page to the court of Ferdinand and Isabella. There he learned to ride, carry arms and do all the things considered a part of the training of a young Spanish nobleman; later he joined the soldiers of the Duke of Najera.

In a war with France, while helping defend the city of Pampeluna, young Recalde was seriously wounded. He was taken to the castle of Loyola and after weeks of desperate illness grew better. While he was getting well two books were given him which helped to change his whole life. They were *The Life of Christ* and *Flowers of the Saints.* Under the influence of these books, Inigo began to think of devoting himself to the Church, and after a great mental struggle determined to renounce the pleasures of the world.

After a year of prayer and self-denial in the convent of Manresa he wandered about as a pilgrim, helping those in need, preaching and visiting the holy places. In 1524, feeling the need of more learning than the scant education given a Spanish nobleman, and though thirty-three years old, Ignatius entered a grammar school in Barcelona. Later he studied at the universities of Barcelona, Alcala and Salamanca. From Spain he went to Paris, where he took a seven-year course of general and religious training.

It was in Paris, in 1534, that the little group of seven who were to be the core of the famous Society of Jesus first bound themselves together to serve the Church. About six years later Pope Paul III recognized the little Society and gave it his blessing. Loyola was elected the first general and thereafter devoted himself to the writing of its *Constitutions* and *Spiritual Exercises,* and to its organization and government. He succeeded so well in this undertaking that he is known as one of the world's greatest organizers and educators.

Loyola is the man above all others to whom the Jesuits owe their greatness: to his executive ability and farsightedness in providing for the action of each small cog in the machinery of the organization is due the unity and great strength of the Jesuits. He also made the plans for the educational system that produced some of the great Roman Catholic theologians. In 1556, after a short illness, Loyola died, but the Society he had founded became one of the most powerful agents of Christianity, education and civilization in the world. G.W.M.

Consult Thompson's *Life of Saint Ignatius;* Hughes' *Loyola and the Educational System of the Jesuits,* in Great Educators' Series.

LÜBECK, *lü'bek,* one of the three free city states of Germany, the others being Hamburg and Bremen. It is situated in the northwestern part of the German Empire, on the Baltic Sea. Its area is 115 square miles, which includes the city of Lübeck, the town of Travemünde, a number of villages in the surrounding rural district and small isolated portions of Holstein and Mecklenburg-Strelitz. The city of Lübeck, its capital, is at the mouth of the Trave River, twelve miles inland from the Bay of Lübeck. The population of the entire city state is 116,599 (1910), nearly all of whom are in the city of Lübeck.

The city of Lübeck is especially interesting because of its medieval architecture, much of which still remains. The walls and bastions which once surrounded the city have been leveled and are now lovely broad walks. There is in the cathedral of Lübeck some very old and rare wood carving. In the church of Saint Mary's, a pure Gothic type, are paintings by Holbein and Van Dyke. One of the quaintest buildings of the city is the Rathaus, or town hall. Although the city is not as strong commercially as it was in the days of the Hanseatic League, it has long carried on an extensive commerce with Russia, Denmark and Sweden. The chief articles of trade are timber, grain, coal, iron, wire and groceries.

The story of the rise of the three city states of Germany is told in the articles CITY STATES and FREE CITIES.

LUCCA, *look'kah,* known as *Lucca, the Industrious,* the chief town of the Italian province of the same name, has an extensive trade in olive oil, silks, velvet, and other textiles, while many of its thrifty people find employment in its foundries and glass and paper factories. It is situated in the northern part of Italy, thirteen miles northeast of Pisa. The town contains about forty churches, some dating back to the seventh and eighth centuries. It is exceptionally rich in artistic and scientific institutions and has four libraries. On the remains of a large Roman amphitheater now stands the city market. The surrounding country abounds in beautiful villas. Sixteen miles north of the town are the baths of Lucca, celebrated since the fifteenth century.

The province of Lucca, which has an area of 558 square miles, is noted for the fertility of its soil and the superiority of its yield. Originally belonging to Etruria, Lucca was taken by the Romans in 177 B.C. Later its power was weakened by the contests between the Guelphs and Ghibellines (which see). In 1815 it was given to Maria Louisa of Spain, and in 1847 her son, Charles Louis, ceded it to Tuscany. In 1860 it became a part of United Italy. Population of city and suburbs, 1911, 76,160.

LUCERNE, *lu surn',* LAKE OF, a lake in Western Switzerland, famous for its beauty. It is roughly in the shape of a cross, with irregular, winding arms between steep, rocky cliffs which in some places have pushed so far out into the water that they have made of Lucerne five divisions. The Bay of Lucerne forms the upper end of the cross, the bays of Alpnach and Küssnacht form the cross arms, the Weggiser See and the Buochser See comprise the main body. Each of these divisions is shut off from the others as far as the view is concerned and each has its own kind of beauty.

LOCATION MAP

Lucerne, a quaint town of Switzerland, on the banks of Lake Lucerne, a favorite city for tourists in Switzerland. The town is divided into two parts by the River Reuss, the modern section with broad streets and great hotels on the west, the medieval town of crooked, narrow streets and old-fashioned houses on the east. In the latter part is the Hofkirche, a church of 1506; the sixteenth century town hall with its collection of art and antiques, and the famous "Lion of Lucerne," a huge dying lion carved in solid rock in memory of the Swiss Guards mas-

THE LION OF LUCERNE

The inscription, freely translated, reads: *To the Fidelity and Courage of the Helvetians.*

sacred in defense of the Tuileries, in Paris, August 10, 1792. Population, 1910, 39,152.

LUCIFER, *lu'si fer,* from a Latin word meaning *light-bringing,* is a name sometimes given by poets to the moon, to the planet Venus when it appears as the morning star, and to day. Many writers, among them Milton and Shakespeare, called Satan *Lucifer,* because the following Biblical reference in *Isaiah* XIV, 12, was in ancient times wrongly interpreted to mean Satan:

> How art thou fallen from heaven, O Lucifer, son of the morning! how art thou cut down to the ground, which didst weaken the nations.

LUCKNOW, *luk'nou,* the most ancient of the great cities of India, and famous as the scene of a memorable siege during the Sepoy Rebellion of 1857. Up to the time of the rebellion, Lucknow was the capital of the independent state of Oudh, but after the English recaptured the city in 1858, it was made the capital of a district in the United Provinces of Agra and Oudh. See SEPOY REBELLION.

Situated on the right bank of the Gumti River, with several suburbs on the opposite side of the stream, the city from a distance presents a striking appearance, with its minarets and gilded cupolas, but a nearer view discloses a crowded Oriental town with narrow streets and shabby little houses. There are, however, a number of buildings of modern construction, and in the better quarter the broad streets are lined with handsome homes. Under English control considerable improvement has been made in the sanitary conditions. Several beautiful mosques, relics of former days, relieve

the sordidness of the ancient city. There are produced in Lucknow silver, copper and brass wares, embroideries and cotton fabrics, and the place is an important educational center. The population is about 260,000, of which three-fifths are Hindus, while the rest are Mohammedans and Christians.

LUCRETIA, *lu kre'shi a,* a heroine in early Roman history, the virtuous wife of Lucius Tarquinius Collatinus, who was bitterly wronged by Sextus, son of the seventh king of Rome, known as Tarquin the Proud. After telling her story in the presence of her husband and father and her cousin Brutus, Lucretia slew herself with a dagger. Her death was the signal for an uprising. The Romans took oath that never again would they have a king in Rome, and they placed two consuls at the head of the state, one of them being Brutus. The king and his sons were expelled from Rome and never regained power. See CONSUL.

LUCRETIUS, *lu kre'shi us,* TITUS CARUS (about 99 - about 55 B. C.), a Roman poet of the first rank. The only information concerning his life is found in a brief summary written four centuries after his death. It is said he died by his own hand at the age of forty-four. His great work, *De Rerum Natura* ("Concerning the Nature of Things"), a poem in six books, is still unequaled as a philosophical poem. Its great object was to free mankind from the fears of death and the life hereafter. This poem has influenced the writings of a number of the foremost poets of England; this is evidenced in Tennyson's *Lucretius.*

LUD'INGTON, MICH., the county seat of Mason County, is a freighting center of importance and a summer resort. It is on the east shore of Lake Michigan, at the mouth of the Marquette River, fifty-four miles north of Muskegon and eighty-five miles northwest of Grand Rapids. It is served by the Pere Marquette Railroad and a fleet of car ferries which transfer freight cars across the lake to ports in Wisconsin and the northern peninsula of Michigan. There are also electric interurban lines, and steamboat lines to Chicago, Milwaukee and other lake ports. The area of the city is two and a half square miles. Scandinavians and Germans constitute nearly fifty per cent of the population, which in 1910 was 9,132; in 1916 it was 10,367 (Federal estimate).

A breakwater constructed by the government at a cost of $1,000,000 furnishes the city one of the best harbors on the lake. Epworth Heights, two miles north of Ludington; a student's military training camp north of Epworth Heights, and Hamlin Lake, six miles north of the city, are resorts which attract many summer visitors. The city contains several parks, the county courthouse, a United States weather bureau station and a Carnegie Library. Ludington manufactures lumber, formerly a more extensive industry than at present, game boards, watch-cases and printers' supplies, and has a large trade in grain and fruit.

A settlement was made in 1859 and named for Pere Marquette; the explorer was buried here, but later his body was removed to Point St. Ignace. In 1871 the place was renamed in honor of James Ludington, a lumberman, and in 1873 it was chartered as a city. E.A.N.

LUDWIGSHAFEN, *loot viKs hah'fen,* a city of Southwestern Germany, lying directly across the Rhine from Mannheim, and noted as the commercial center of the Rhine Palatinate. It was founded in 1843 by Louis I of Bavaria, as an outpost against Mannheim. The largest chemical factories in the world, the Badische Aniline and Soda Works, are in Ludwigshafen, and since the opening of the harbor in 1897 its trade has developed greatly. There are manufactories of cellulose, fertilizers, flour, vinegar and malt, sawmills, iron foundries, breweries, brick works and woolen factories. Population, 1910, 83,300.

LUGANO, *loo gah'no,* LAKE OF, known to the Italians as *Lago Ceresio,* lies at the foot of the Alps, 889 feet above sea level. It is fourteen and one-half miles in length and is situated partly in Lombardy, Italy, partly in the Swiss canton of Ticino. The name is derived from the town of Lugano, the only important place on its banks. Picturesque villas stud the lower slopes of the surrounding hills, which abound in vineyards, olive and orange groves, and forests of chestnut and walnut. From Monte Salvatore, 2,982 feet in height, a beautiful view of the picturesque town and lake is obtained.

LUKE, SAINT, "the beloved physician" who accompanied Paul on two of his missionary journeys, and who recorded in the third Gospel, which bears his name, and in the *Acts of the Apostles,* many events of the time in which he lived. He was probably born in Antioch, where he received a good education, not only as a physician but also in literary lines. When Paul went to Troas on his way to Macedonia, Luke joined him, and from that time on he was an intimate friend and companion of the apostle, assisting him much through his knowledge of

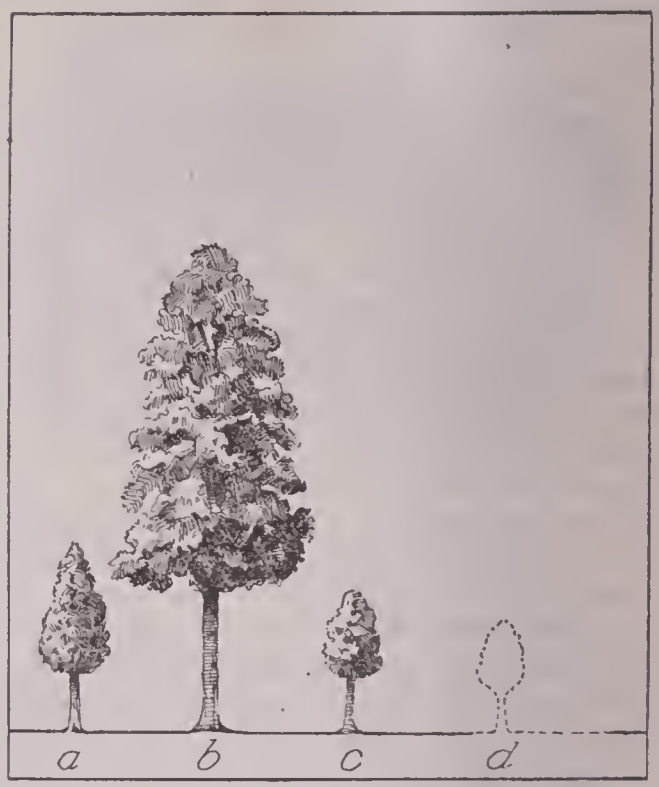
medicine. He was a believer in Christ before he joined Paul, but was probably a Gentile, although some authorities say that he was a Jew. The time and manner of his death are unknown. See GOSPELS; ACTS OF THE APOSTLES.

LUMBAGO, *lum ba'go,* a very painful ailment, seated in the lumbar region. It derives its name from the Latin *lumbus,* meaning *loin.* Usually it is due to a toxic condition of the system arising from intestinal fermentation or to infection somewhere in the body, and is akin to rheumatism. The pain may be a dull ache, but is generally sharp and produces stiffness in the muscles. Rest and warmth are of first importance in the treatment of lumbago. The affection may last for a few hours, or it may continue for weeks and completely incapacitate the patient. Hot drinks, a Turkish bath, and in severe cases, a blister may be employed to relieve the pain, but a physician should be summoned if the attack persists.

LUM'BER is prominent among those natural resources which have made possible the rapid growth of the two great nations of America, the United States and Canada. When the rise of cities, is counted in years or days, rather than in centuries, as in the older parts of the world, wood must be the chief if not the only material of which they are first built. It is said that for every person in the two countries named as much timber is cut as for two people in Scandinavia, seven people in Germany or eighteen in Great Britain. In the United States about half of the timber consumed is firewood, one cord for every person; in Canada an equal amount is burned by each inhabitant, but the total is two-thirds of the timber consumed. In recent years steel and concrete have supplanted timber in larger structures, and there has been increased use of brick, stone and terra cotta. But paper making and other industries produce a growing demand for lumber, and the amount of it milled has been about the same each year for a number of years.

THE PRESENT STAND OF TIMBER

In 1917: (*a*) 2,826 billion feet of merchantable timber were standing in the United States, and 800 billion feet in Canada; (*b*) 2,200 billion feet in the United States were in private ownership, and only 40 billion feet owned or leased privately in Canada; (*c*) 626 billion feet in the United States were in public ownership, while 760 billion feet were so held in Canada; (*d*) in the United States 340 billion were owned by eight private companies.

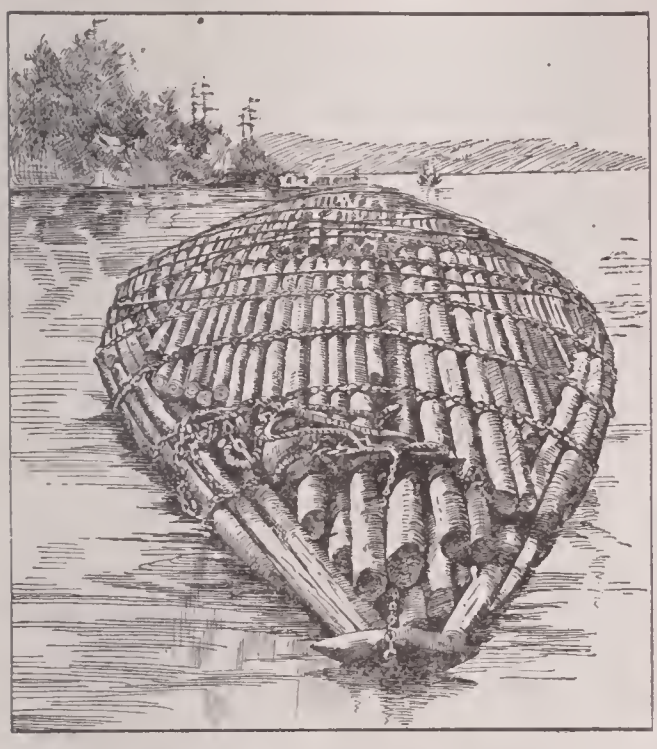


THE GAIN AND THE LOSS

(*a*) In the United States 9 billion cubic feet is the annual growth, 5 billion cubic feet in Canada; (*b*) 23 billion cubic feet is the annual cut in the United States, 3 billion in Canada, including that used as fuel; (*c*) 7 billion cubic feet is the annual fire loss in the United States, 2 billion feet in Canada; (*d*) an unknown quantity is killed by insects, blight, etc.

How Trees Are Made into Lumber. Lumbering is one of the most picturesque and interesting of industries. In some parts of the great forests of Wisconsin, Michigan and Minnesota and of Eastern Canada the trees are cut only in winter. The "lumberjacks" are hardy men; they carry on their task of cutting and hauling in the worst of weather, and in their spring work on the river with the floating logs they endure icy baths with no apparent discomfort. Sometimes the logs float downstream singly, some-

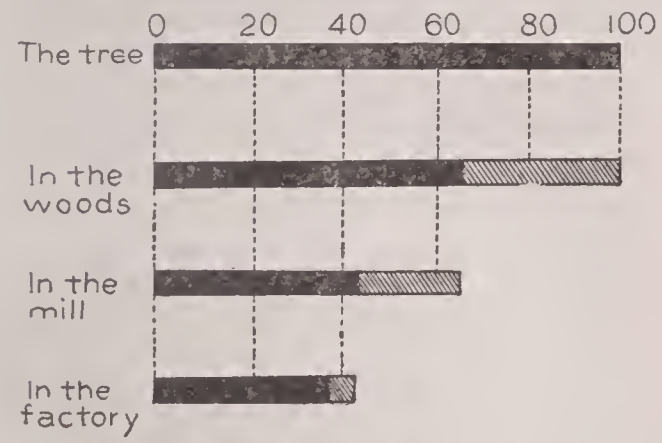
times bound together in a rude raft called a boom. The men travel with them, living in raft shanties. Their business is to see that the logs do not get caught in rapids or falls, or at



LOG RAFT

A common scene on rivers in the Pacific states and in Western Canada. In this way thousands of logs are towed out into the ocean on their way from forest to mill.

bends in the stream, and form a *jam,* and a "lumberjack" can walk on a rolling, tumbling log as easily, apparently, as on a sidewalk. The Mississippi has been one of the great highways for lumber logs, but since the spring of 1916 no



A PART OF THE LUMBER WASTE

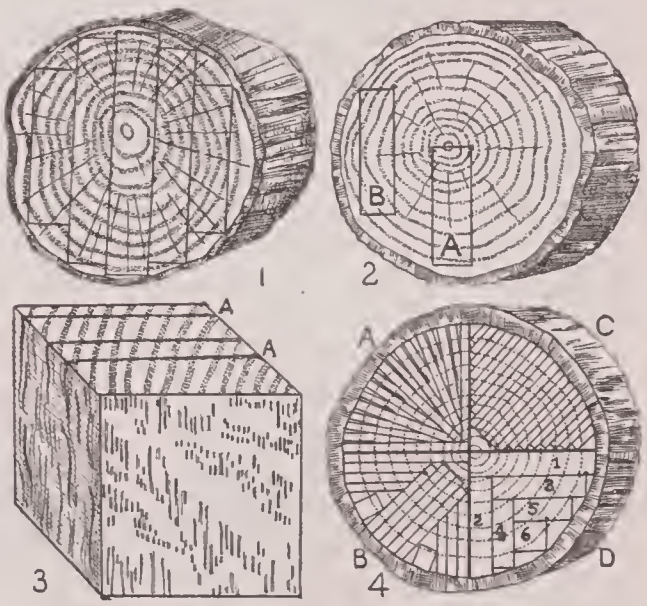
Of the 100 per cent of wood in a tree, 37 per cent is lost in the forest; of the 63 per cent of the tree which reaches the mill only 42 per cent is utilized, and in the factory the part used is only 38 per cent of the original tree.

rafts have been permitted on it. The Ottawa River, in Canada, is now perhaps the most important stream where this type of lumbering may be seen, with all its old-time picturesque and adventurous element.

In the South, from which comes the largest part of the lumber of the United States, railroads are built into the forests and the logs are pulled or *skidded* to the cars either by machinery or by horses. In British Columbia and the Puget Sound region machine power is employed almost entirely, because of the great size of the trees which are cut. In other lands many novel methods of lumbering are practiced, and in Burma you may see, as Kipling says—

> Elephints a-pilin' teak
> In the sludgy, squdgy creek.

After logs reach the sawmills they are handled almost entirely by machinery. They are cut by circular saws or by band saws—long belts of toothed steel moved rapidly by large wheels. Gang saws are parallel sets of circular saws which cut a log into several boards at once. Saws give rough surfaces to the lumber.



HOW LUMBER IS SAWED

In cutting logs the lumberman has three aims: to gain quantity, strength, and, in some cases, beauty. (1) The lines for cutting show a simple method when quantity is important. (2) Plank *B* will warp in drying, because the rings at the outer edge are longer and will shrink more than those at the inner side; plank *A* will not warp. (3) The beauty of quarter-sawed oak is gained by cutting a plank with a silver-grain surface—that is, along the rays *A A*, which run from the center of the tree to the bark. (4) Four methods of quarter-sawing: *A* makes every plank silver-grained and not liable to warp, but wastes over one-fourth of the log; *B* saves time but not material, and the planks are nearly as high grade as in *A*; *C* is economical, but only one-fifth of the planks have real beauty and strength; *D* is for cutting beams, of which *1* and *2* are the best, *5* and *6* the poorest.

Special machines, usually in a separate establishment, called a planing-mill, finish the lumber which must be smooth.

New lumber contains so much sap that it must be dried, either in kilns or in the air. If seasoned in the open air from one to four years it is suitable for most purposes, but will shrink

if placed on the inside of houses kept hot in the winter. Kiln-dried boards are seasoned for only a few weeks.

The Industry. In Canada, logging and lumbering are by far the most important industries, next to agriculture. In the United States they rank third. Not including lath, shingles, poles, railroad ties, firewood, barrel hoops and other special varieties of wood products, the annual production of lumber in the United States is about forty thousand million *board feet* (see explanation below). In Canada the output is about one-tenth as much, slightly less than that of either Washington or Louisiana, or of Mississippi and Oregon combined.

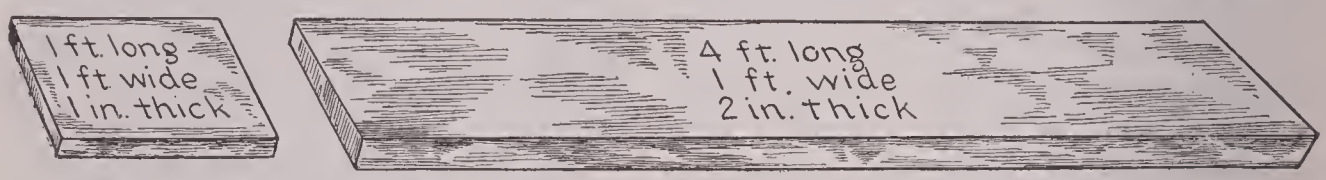
The principal varieties of Canadian lumber are spruce, douglas fir and white pine. In the United States yellow pine is far in the lead, with Douglas fir and oak next in importance. Aside from the unusual woods, yellow poplar, ash, oak and cypress are the most valuable timbers.

North America has about one-third of the forests of the world. Russia contains two-thirds of those in Europe and over half of those in Asia, and is by far the greatest lumber exporter in the world, though its annual cut is only one-third that of the United States. The tropical forests of South America are among the world's largest. From them come rosewood and mahogany and many marvelous woods as yet little known elsewhere.

More about lumber will be found in the articles on pine, oak, and other trees.

Purchasing Lumber

Lumber is ordinarily sold at a price per *board foot,* which is the quantity contained in a piece one foot long, one foot wide and one inch thick. Thus a piece of timber 16 feet long, a foot wide and an inch thick contains 16 board feet. One of the same length and thickness but only 8 inches, or ⅔ of a foot, wide, contains 16x⅔x1, or 10⅔ board feet. A piece 16 feet long, 8 inches wide and 2 inches thick contains 16x⅔x2, or 21⅓ board feet. Because boards less than one inch thick are planed from one-inch boards, they are usually considered to be the latter. Most varieties of lumber are known by the same names throughout the United States and Canada.



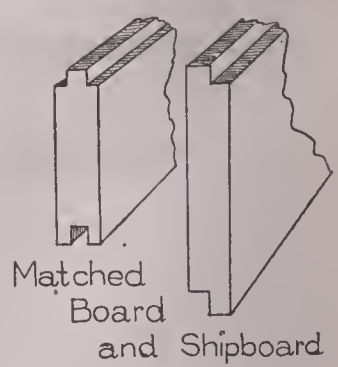
HOW MANY BOARD FEET IN EACH PIECE OF LUMBER?

Timbers for framing are usually described by their size (see CARPENTRY). Thus a timber 4 inches square is known as a *four by four,* commonly written *4x4*. If it is sixteen feet long it is called a *four by four sixteen*. The price per foot is usually greater for timbers over 18 feet long.

Boards planed on one side only are known as *No. 1 common, No. 2 common,* etc., according to their quality. They are sold in varying length and width, the former usually from 10 to 16 feet, the latter from 6 to 12 inches. The buyer usually specifies the total number of feet he wishes and receives an assortment of sizes; he can, however, obtain all in one size, but in ordering boards of particular length or width should state that he wants common boards, or he may receive those planed on both sides, which are more expensive. *Finished* boards are frequently sold by the *running foot* instead of the board foot.

Shipboard is like common boarding, but cut at the edges, as shown in the illustration.

Matched boards have a tongue and a groove, as in the picture. Finished flooring is of matched boards, usually four inches wide. In estimating the quantity needed, add one-fourth to the number of feet of 4-inch boards required; this will equal the loss caused by the tongue and groove.



Siding is made in a number of styles. Clapboards, sometimes called beveled siding, are wedge-shaped; ⅝-inch thick at one edge, ⅜-inch at the other, and from 4 to 6 inches wide. Beveled siding is the best, but requires more labor.

Shingles are from 14 to 18 inches in length, and from 4 to 7 inches in width. An 18-inch shingle should not be exposed more than 5 inches to the weather.

Planks are ordinarily 2 inches thick and at least 6 inches wide.

Laths are sold in bundles of 100. They are 4 feet long, one and a half inches wide and one-fourth inch in thickness.

Estimating. In deciding how much lumber to purchase for a house like that described in the article CARPENTRY, some parts, such as sills and joists, can be exactly counted. Studs, beams and rafters can also be counted, but as the carpenters may not cut the long pieces exactly as the estimator might plan, it is well to allow a number of extra pieces.

In ordering boards to cover the walls and floor no deductions need be made for openings, for the saving due to them is usually offset by waste. If the boards are to be laid diagonally, the quantity needed will be 10 per cent greater. The number of feet of 4-inch siding required is about one-third greater than the amount of boards for the same area. The number of shingles necessary depends on the width to which each row is to be exposed to the weather. If this width is multiplied by the average width of the shingles to be purchased and by the number of shingles in a bundle, usually 250, the result will be the number of square inches which a bundle may be expected to cover. The amount of nails needed for a building will vary from 20 to 40 pounds per 1,000 square feet of each kind of material, and will be about 5 pounds for each 1,000 shingles. C.H.H.

Consult publications of the United States Forest Service, issued by the Department of the Interior, Washington, D. C.; Kellogg and Ziegler's *Cost of Growing Timber;* Fernow's *Brief History of Forestry in Europe, the United States and Other Countries.*

LUMP'FISH, or **LUMP'SUCKER,** a group of North Atlantic fishes, so called because of their awkward shape and the presence of a sucking disk formed by the union of the back fins (the ventrals). This disk enables them to attach themselves and cling firmly to an object several times their weight. The fish has a grotesque form, with a thick, short head and body; the back is arched into a ridge; the belly flat and the fins rather small. Before it spawns it is beautifully colored with varying shades of crimson, purple, blue and orange, but afterward it changes to a dull olive tint. It attains a good size, often weighing seven pounds. The lumpsucker abounds in the coast waters of the North Atlantic in both hemispheres. The flesh is soft and oily and is therefore not generally esteemed as a food. In Great Britain it is known also as the *cock paddle.*

LUMPY JAW, or **LUMP JAW,** a cattle disease which consists, as the name indicates, in the formation of a lump or swelling on the jawbone. It is caused by a fungus which the animal takes into the system from the grass, vegetables or grain which is eaten. One animal rarely infects another.

Symptoms. A slight swelling of the lower jawbone occurs, usually back in the region of the molar teeth; this swelling, or lump, increases slowly in size until finally it breaks down in abscess formation, and the discharge of a quantity of matter takes place. This leaves a hole, or *sinus,* opening directly into the bone; the discharge persists, the matter becoming more yellow, and "proud flesh" forms around the sides of the opening. The matter then has an offensive odor and contains small, yellowish grains, which, being examined, are found to contain the germ causing lumpy jaw. The animal loses in condition, it cannot eat, and if not cared for it dies.

Treatment. As soon as the disease is recognized, surgical treatment should be started, consisting of a cleansing of the opening and scraping the diseased bone underneath. If this is done thoroughly and in time, the animal may be cured, but if it is allowed to continue long, death will result. S.C.B.

Consult "Investigations Relating to the Treatment of Lumpy Jaw," *Bulletin 2,* United States Department of Agriculture.

LU'NA, the Latin name for the moon. To the Romans, however, this chief ornament of the night was not a planet, but a goddess, who drove her silvery chariot across the sky. This goddess was not always gentle and kind, and was sometimes believed to drive insane those who had seriously offended her. From this old superstition the word *lunatic* grew up, and thus means literally the same as *moonstruck.* But there was another deity, a far more important one, named Diana (which see), and since she was the sister of the sun god Apollo, she must, argued her worshipers, have something to do with the moon. To her, therefore, were gradually transferred the qualities of Luna, until in time the two were merged into one conception. Luna, however, was the original Roman moon goddess, and her worship dated back to the time of Romulus, the founder of Rome, in 753 B. C.

LUNACY, *lu'na si,* a term applied to certain mental conditions produced by disease or defect of the brain, rendering a person not responsible for his acts. The words *lunacy* and *lunatic* were derived from *luna,* meaning the *moon;*

this is explained in the article LUNA. The study of lunacy is one of the most difficult subjects of medical inquiry. In the United States, Canada and in most other countries, the laws require that protective authority be exercised over lunatics and idiots, in order to prevent injustice. Every person is presumed by law to be of sound mind until proved to the contrary; if lunacy is proved before a competent court, the patient may be placed under guardianship. Insane persons are incapable of judging between right and wrong, and they are not held responsible personally for their criminal deeds, but may be held liable civilly for damage resulting from their wrongful acts, and may sue, or be sued, in the name of their guardians. See INSANITY.

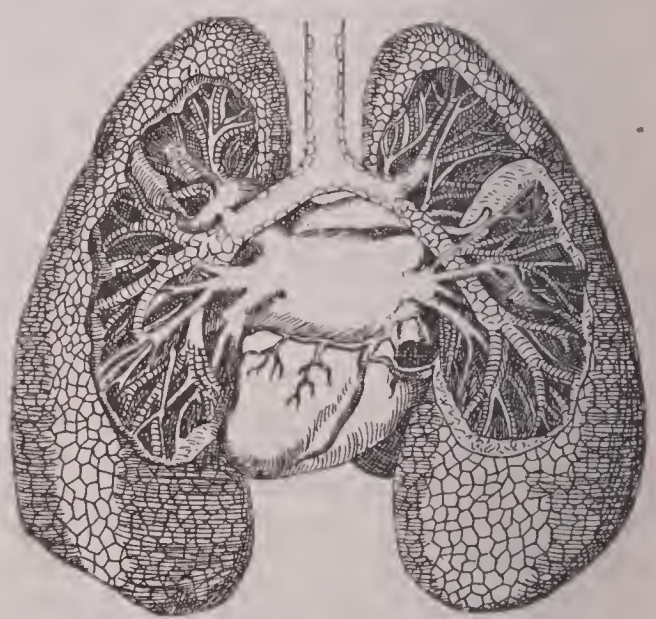
LUNAR CAUSTIC, *lu'nar kaws'tik,* or **NI'TRATE OF SILVER,** is a very important chemical compound much used medicinally in diseases of the stomach and intestines. When melted at a high temperature and molded into sticks, it is used to cauterize poisonous wounds and to remove warts or "proud flesh." It has even been applied in smallpox to prevent pitting. Chemically, it is of value as the primary compound from which other silver compounds are made. It is blackened by exposure to light and leaves a brownish-black stain on the fingers. It is the basis of many black hair dyes and of some indelible inks.

LUN'DY'S LANE, BATTLE OF, in the War of 1812, was an engagement fought on Canadian soil about a mile from Niagara Falls, on July 25, 1814. With the exception of the Battle of New Orleans, which was fought after the treaty of peace was signed, this was the last important battle of the war. The British forces, driven back after the failure of their attack on Chippewa, took up a new position on Lundy's Lane, a roadway within sound of Niagara's roar, where they received reënforcements under General Drummond. At Chippewa was an American army of 4,000 men under the command of General Jacob Brown. On the afternoon of July 25, Brown ordered General Winfield Scott to advance on Queenstown with a force of about 1,300 men. While on the march Scott's forces came upon the British, about 2,800 strong. It was then five o'clock, but before darkness fell General Brown arrived on the field with reënforcements from Chippewa. The battle raged until midnight, the losses on both sides being severe.

Both sides claimed the victory, but neither won a decided advantage. The Americans withdrew unmolested from the field, and retired first to their original camp at Chippewa, and then to Fort Erie. They made no further attempt to invade Canada. In this battle the Canadian militia upheld their reputation, and won warm praise from General Drummond for their zeal and gallantry. See WAR OF 1812.

LUNENBURG, *loo'nen burg,* the county town of Lunenburg County, Nova Scotia. It is situated seventy miles southwest of Halifax, on a small bay on the Atlantic coast, and on the Halifax & Southwestern Railway. It has a fine harbor and considerable foreign trade in fish and lumber, particularly with the United States and the West Indies. The fishing fleets which make Lunenburg their headquarters comprise about 150 vessels and employ over 2,000 men. The town has machine shops and foundries, shipyards and various establishments for ship supplies. It was settled in 1753 by Germans, and still retains a distinctly German atmosphere. Population in 1911, 2,681.

LUNGS, in the body of man and other vertebrate (backboned) animals, a pair of large, spongy organs, lying in the chest cavity. They are intimately connected with one of the processes upon which life itself depends, for



THE LUNGS
With trachea and bronchial tubes exposed.

they are the most important of those organs through which breathing, or respiration, is carried on.

Description. The lungs form a pyramid-shaped mass whose base rests on the diaphragm muscle, and the top of which is up behind the collar bone. Between the two lungs are the œsophagus, the heart and the larger blood vessels. At the top they are united by the windpipe (see TRACHEA), which, after it enters the

chest cavity, divides into a right and left *bronchus*. Each bronchus enters a lung, where it divides and subdivides into countless minute tubes, the smallest of which open into cup-shaped depressions known as *air sacs*. Each of these has upon its inner surface a close network of blood tubes called *capillaries*. The air sacs are arranged in groups known as *lobules*, and the lobules are united into *lobes*. There are two lobes in the smaller left lung, and three in the right.

The bronchial tubes and blood vessels, together with lymphatics and nerves, with which the lungs are also supplied, are all bound together by elastic tissue; the lungs can therefore stretch like rubber bags when filled with air. In proportion to their size they are the lightest organs of the body, weighing in man about three and one-half pounds and in woman about two and three-fourths pounds. The lungs of a baby are pinkish, those of an adult slate-colored and mottled, and those of an elderly person of a still darker tint. The change in color is more pronounced in the lungs of city dwellers, who live in a smoky and dusty atmosphere, than of those who breathe the pure air of the country.

The Work of the Lungs. It is by means of the lungs that the body cells are kept supplied with oxygen. As the blood circulates through the body, carrying nourishment to its tissues, it gives up oxygen and absorbs impurities, and must be sent to some central supply station to be renewed. The lungs constitute this supply station. With each intaking of the breath a quantity of fresh air containing oxygen is carried to the lungs, and the oxygen, seeping through the thin walls of the air sacs and of the capillaries embedded in them, is absorbed by the blood, to be carried to all parts of the body, while the waste material (carbon dioxide) is expelled as the air is breathed out again. The process of taking air into the lungs is known as *inspiration*, and that of expelling it as *expiration*. In the ordinary breathing of an adult about eighteen inspirations and expirations occur every minute, night and day. The extent of lung surface exposed to the air is surprisingly large; if the walls of the air sacs could be spread out flat and placed side by side they would cover an area of 2,600 square feet. It has been estimated that about twenty-five ounces of oxygen are taken into the body each day. A detailed description of the processes of inspiration and expiration may be found under the heading Breath and Breathing.

Diseases and Care of the Lungs. The most dangerous of the diseases peculiar to the lungs are *pneumonia* and *consumption*. Both are infectious diseases and both are most prevalent among those who live in crowded, insanitary quarters and are forced to breathe foul air. Pneumonia is inflammation of the air cells in the lungs; inflammation of the bronchial tubes is known as *bronchitis;* and *pleurisy* is the name given to inflammation of the *pleura*, the thin, elastic membrane that covers the outside of the lungs. The importance of having public halls, schools and homes well supplied with fresh air is more and more being emphasized as the weakening effect of bad air on the lungs and on the entire system is becoming generally recognized (see Heating and Ventilation). It is also important that the lungs have ample space in which to expand and contract. The practice of wearing clothing that restricts the movements of the ribs and abdomen in the breathing process, and habits that make one stooped and round-shouldered, cannot be too strongly condemned.

Alcoholic beverages and cigarettes should be avoided by anyone who wishes to have a strong, healthy pair of lungs. Alcohol tends to diiate the blood vessels and to thicken the walls of the air sacs, decreasing the supply of oxygen and interfering with the interchange of oxygen and carbon dioxide. Habitual users of alcohol are especially susceptible to pneumonia. Cigarette smokers, in order to secure the full enjoyment of the weed, usually draw the smoke into the lungs, and the poisonous nicotine is absorbed by those organs. S.C.B.

Consult Janeway's *Respiration.*

Related Subjects. The reader is referred to the following articles in these volumes:

Asphyxiation	Heart
Breath and Breathing	Pleurisy
Bronchitis	Pneumonia
Circulation of the Blood	Pulmotor
Drowning	Tuberculosis

LUNGWORT, *lung'wurt,* a perennial herb of the *Mertensia* family, named in honor of Franz Mertens, a German botanist. It is known also as *Virginia cowslip* and *bluebell,* and is a favorite early spring flower from Southern Canada to South Carolina and west to Nebraska. The flowers are trumpet-shaped, pink in the bud, but afterward purplish-blue, and hang in loose clusters at the end of a smooth, leafy stem. The leaves are large and at first are rich dark purple, later becoming bluish-gray. When mature the flower has four seedlike nuts of a leathery appearance.

The name is also applied to an olive-green lichen found on trunks of trees in mountainous regions in North America and Europe, and to an European plant with small, purple flowers, whose white-spotted leaves were supposed to resemble a diseased lung. Both of these plants were once used as remedies for lung trouble.

LUPERCALIA, *lu per ka'li a,* one of the most ancient of Roman festivals, celebrated annually in honor of Lupercus, a rural Italian deity, afterwards identified with Pan, the god of herds and fruitfulness. The rites took place at the Lupercal, a cave in the Palatine Hill, Rome. Goats and dogs were sacrificed, and their skins were cut into lashes. Armed with these the priests ran through the byways, striking all the people they met. The ceremony typified purification. It took place on the fifteenth of February, which was originally the last month of the Roman year.

The Lupercalia is frequently mentioned in literature, which fact possibly emphasizes its ancient importance. Mark Antony, in his oration over the body of Caesar, as given in Shakespeare's *Julius Caesar,* exclaimed:

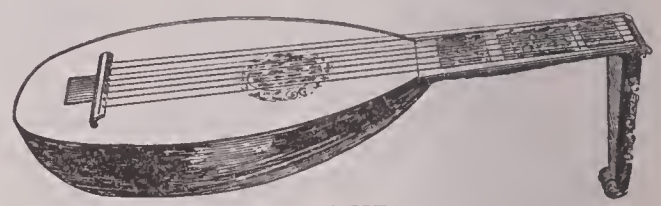
You all did see that on the Lupercal
I thrice presented him a kingly crown,
Which he did thrice refuse: was this ambition?

LUPINE, *lu'pin,* a group of herbs and shrubs of the pea family, whose generous content of nitrogenous matter makes them valuable to the farmer by enriching the soil (see NITROGEN). The name comes from the Latin *lupinus,* meaning *wolfish;* it is not known why it was so applied. Lupines grow in the temperate regions of North and South America, about ninety species being native to the United States and Southern Canada. They bear beautiful white, yellow or blue flowers, resembling small sweet peas, and are cultivated for decorative purposes, both in gardens and in greenhouses.

LU'PUS. When the germ of consumption attacks the skin, usually producing various-sized pimples on the face, the trouble is named *lupus.* It is to be regarded, like all consumptive troubles, as a terrible enemy, running a slow, gradual course and possibly breaking down to form ulcers, which spread slowly over the face. The location which seems to be commonly selected is the cheek, in the region of the nose. In the beginning of the trouble, several hard pimples appear; they are in size from a pinhead to a pea and are of a brownish-red color. These break down and form ulcers, which, if they heal, leave bad scars. Lupus is very slow in its progress, but in the end often results in death. Great care should be used in treatment, and the utmost patience must be exercised. Only a competent physician should be permitted to care for the patient; home remedies are usually of little value. S.C.B.

LURAY, *lu ra',* CAVERNS, a group of underground chambers near the town of Luray, Va., discovered by Andrew J. Campbell and his companions in August, 1878. These underground galleries are in the limestone belt of the Shenandoah Valley, on the west side of the Blue Ridge Mountains. The area explored extends over about 100 acres, under some of the low spurs of the Blue Ridge. Electric lights have been installed, so one may see the many stalactites, snow-white, pink, blue and amber-colored, the hundreds of chambers and the tiers of galleries, some of which are 260 feet high. Many of the columns are over fifty feet in height and give out a hollow, bell-like sound when struck. About 20,000 visitors register each year. See STALACTITE AND STALAGMITE.

LUTE, an ancient, stringed, musical instrument, formerly a great favorite, but in modern times almost entirely supplanted by the harp and the guitar. It originally contained six strings, but the number was gradually increased



THE LUTE

Probably the most-frequently quoted lines with reference to the lute are from Tennyson's *Idylls of the King:*

It is the little rift within the lute
That by and by will make the music mute,
And ever widening slowly silence all.

to twenty-four, between the fourteenth and the seventeenth centuries. The instrument consisted of four parts—the table, which contained a round opening in the middle; the body, which was shaped like the back of a present-day mandolin and contained nine convex ribs; the neck, which had the same number of divisions; and the head, or cross, which contained the screws for tuning. The lute is played by striking the strings with the fingers of the right hand, while the sound is regulated by those of the left.

LUTHER, MARTIN (1483-1546), the foremost leader in the reform movement of the sixteenth century through which the Protestant Church had its birth, and one of the greatest religious figures of any age. The founder of Protestantism was born on November 10, 1483, at Eisleben, Saxony, in the heart of Germany. He

was the most promising of a large family of children, and his father, a slate-cutter of very slender means, was determined that this son should receive a good education. Accordingly, sacrifices were made to send him to school at Magdeburg and at Eisenach, where he helped to support himself by singing in front of the homes of the rich. In 1501 he entered the University of Erfurt, winning a master's degree there four years later.

MARTIN LUTHER
The man who established the Protestant Church in the world.

Luther had planned to take up the profession of law, but about the close of his university career he came deeply under the influence of a religious revival that was sweeping over Western Europe, and shortly after taking his degree he entered the monastery of the Augustinian Order at Erfurt. In 1507 he was ordained a priest, and the following year was appointed to the chair of philosophy at the new University of Wittenberg. In 1512, on his return from a visit to Rome in the interests of his Order, he took his degree of doctor of divinity, and having been appointed professor of theology at Wittenberg began there a course of lectures on the Bible.

Students from far and wide were soon flocking to the obscure university to attend these lectures, but just when Luther was enjoying his greatest prestige he was called upon to oppose what he felt to be a great abuse in the Church, that is, the method of granting indulgences. At that time an indulgence was the remission of temporal punishment for sin, the guilt of which was already forgiven. Indulgences were granted in return for the performance of some work of piety, charity or mercy, which might include a gift of money to further some good work.

In the year 1517, Johann Tetzel, a Dominican priest, appeared in the vicinity of Wittenberg as the messenger of Pope Leo X, asking the people to secure indulgences. The proceeds of this sale were to go toward the building of Saint Peter's at Rome. When Luther heard that the people were flocking in great crowds about the preacher of indulgences he was sorely distressed, for he was convinced that the methods of Tetzel were harmful and contrary to the teachings of the Church. He made public his objection by nailing to the door of All Saints' Church in Wittenberg a protest which has become celebrated as the "ninety-five theses;" these were destined to bring about a breach in the great Roman Catholic Church that has never been healed.

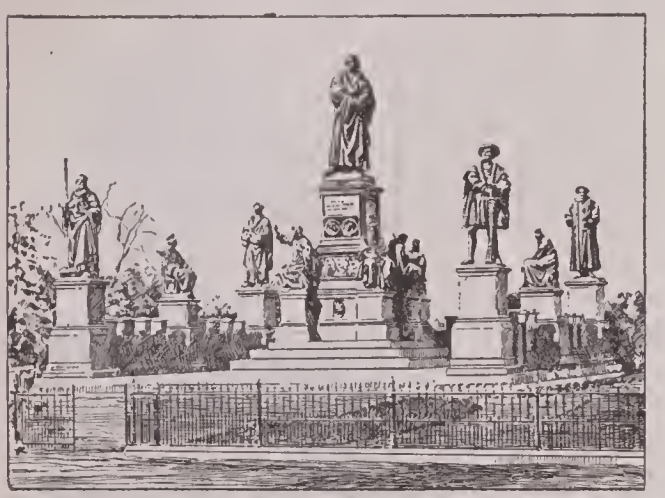
The effect of these sledge-hammer blows against the abuse of indulgences astonished even Luther himself. Though written in Latin they were translated into German and then into various other languages and distributed throughout Europe, and it was not long before their author found himself the storm-center of a great controversy in the Church. His study of the Bible and of Church history and law bore him further and further from the accepted doctrines, and when, in 1519, he engaged in a public argument with the famous Dr. John Eck, at Leipzig, he openly denied the supremacy of the Pope. In 1520 he announced his position in three remarkable pamphlets, *An Address to the Nobility of the German Nation, The Babylonian Captivity of the Church* and *The Liberty of a Christian Man.* In the same year he publicly burned, at Wittenberg, a copy of a Papal bull threatening him with excommunication (see BULL).

LUTHER'S HOME
In Frankfort-on-the-Main.

Luther's defiance of the Pope was followed by a summons to appear before the Imperial Diet which met at Worms in April, 1521. This was an assemblage of German princes, nobles and clergy convened by the newly-elected emperor, Charles V. Luther's answer to the demand of the Diet that he retract his heretical

statements, was as follows: "I cannot, I will not retract anything, unless what I have written shall be shown contrary to Holy Scripture or to plain reason, for to act against conscience is neither safe nor upright." He closed with the words, "Here I stand. I cannot do otherwise. God help me. Amen."

Though placed under the ban of the empire, he was allowed to start for home in safety, but while passing through a valley near Eisenach he was seized by a band of masked horsemen and carried to the castle of Wartburg. This



LUTHER MONUMENT AT WORMS

was done by order of his good friend Frederick, elector of Saxony, who feared for his safety but dared not protect him openly. During a ten-months' sojourn in the castle Luther made a translation of the New Testament from the Greek into German, an event which marks an epoch in the history of German literature. There also he wrote his treatise on *Monastic Vows*.

In March, 1522, he returned to Wittenberg to begin the great work of organizing his new church, and the story of his life from that point is the story of the Reformation. The social unrest of the times, culminating in the terrible Peasants' War, which broke out in Germany in 1525, could not turn him from the cause to which he had dedicated his life. He worked out a new order of church services, and a new system of church government; he wrote catechisms for the instruction of the common people, and he voiced his religious faith and his zeal in a number of fine hymns. The best-known of these, *Ein' Feste Burg,* which has been called the "battle hymn of the Reformation," begins with the stirring lines:

A mighty fortress is our God
A bulwark never failing;
Our helper He amid the flood
Of mortal ills prevailing.

In 1525 Luther married Katharina von Bora, who had, like himself, renounced the life of the cloister. His domestic life was happy, and his hospitable home was a shelter for six children of his own, several orphaned nephews and nieces and numerous impoverished students. He died while on a visit to Eisleben, in 1546. His body was taken to Wittenberg and interred in the famous church on which, twenty-nine years before, he had nailed his ninety-five theses. In 1858 Frederick William IV replaced the old wooden doors of the church with bronze ones bearing the text of the theses. In the city there is a statue of the great reformer, on which is inscribed in German this legend: "If it be God's work, it will endure; if it be man's work, it will perish." B.M.W.

Consult Smith's *Life and Letters of Martin Luther;* Lindsay's *The Reformation in Germany.*

Related Subjects. In connection with the study of Luther, the reader is referred to the following articles in these volumes:

Bull	Protestants
Eck, Johann Maier von	Reformation, The
Indulgence	Saint Peter's Church
Peasants' War	Tetzel, Johann

LUTHERANS, *lu'theranz,* the members of the various branches of the Church which was established in Germany by Martin Luther during the Reformation of the sixteenth century (see REFORMATION, THE). At the present time nearly all of the Protestants in that country belong to the United Evangelical Church, a union of the former Lutheran and the Reformed or Calvanist churches. Lutheranism is now the established religion of Denmark, Norway and Sweden, and the leading religion of the German Empire. A large part of the population in Poland, Prussia, Bohemia, Silesia and Moravia have embraced this faith, and in the United States it has a strong foothold, for there are about 2,445,000 communicants in all the Lutheran bodies. In Canada there are nearly 230,000 in this Church.

When Luther began his work of reformation in the Catholic Church he did not intend to start a new organization, but that was the final result, and the opponents of the reform movement called the Protestants *Lutherans* in derision, although their Church was rightly known as the Evangelical. In 1530 the theologians of the new Church stated their doctrines in the Augsburg Confession, which was adopted, when the Church was recognized by the state twenty-five years later, as the expression of the creed of Lutheranism. At the

present time it is the only statement of doctrine universally recognized by all the divisions in the Church. Their chief doctrine, around which all others radiate, is justification by faith; they also believe in a true sacramental, but not the material, presence of Christ in the Lord's Supper. No other Church has so extensive a doctrinal literature.

The preaching in the regular services consists in teaching rather than in exhortation, and the ministers are trained for their work in colleges established for the purpose. The largest of those in the United States is the Concordia Seminary at Saint Louis, Mo., while another splendid school, the Wittenberg Seminary, is located at Springfield, Ohio. There are five general independent organizations in the Lutheran Church of the United States, the largest being the Synodical Conference of Missouri. Each of these has several divisions, governed by a synod, which acts as an advisory body.

Consult Finck's *Lutheran Landmarks and Pioneers in America.*

LÜT'ZEN, Battles of, two famous battles which were fought in the vicinity of the small town of Lützen, in the Prussian province of Saxony. The first battle took place in November, 1632, during the religious struggle known as the Thirty Years' War (which see). Gustavus Adolphus, king of Sweden, had been moving toward Bavaria, but delayed his plans for conquest there on account of the advance of Wallenstein, commander-in-chief of the armies of the Emperor Ferdinand II. The Swedish leader united his forces with those of Duke Bernard of Saxe-Weimar, and after a hard fight Wallenstein was forced to resign the field of battle to the Swedes, but Gustavus Adolphus was killed. This engagement was of signal importance, for it saved the day for Protestantism in Germany. The second battle occurred on May 2, 1813, not far south of the scene of the first battle. It was the first great combat of the united Russian and Prussian army with Napoleon's forces. Superiority in number gained the victory for the French, although 20,000 men were lost. By this engagement the French regained possession of Saxony and the Elbe.

LUX'EMBURG, a land-locked grand duchy in Europe, one of the smallest independent states in the world. Its 999 square miles are hemmed in by Belgium and Germany, except for a strip of about fifteen miles which touches France. Luxemburg is one of the striking examples of artificial boundaries created by the jealousies of the great European powers. The duchy originally included a much larger portion, which is now a province of Belgium. The Belgians tried to incorporate the whole of Luxemburg into their kingdom after the revolution of 1830, but the powers insisted on forming the independent state which is now the grand duchy. Most of its inhabitants (259,891 in 1910) are of German origin, and speak a

LOCATION MAP

The grand duchy is a little smaller than the state of Rhode Island.

German dialect, with which a great many French words are mixed. French is the language of the court and of business, and is common along the Belgian and French frontiers. Commercially Luxemburg is largely dependent on Germany.

Physical Features. Physically, as in other ways, Luxemburg is not a unit. The northern part is a continuation of the Ardennes Plateau, and rises to an occasional height of nearly 2,000 feet. The southern portion is noticeably lower, is an extension of the Lorraine Plateau, and is remarkable for its fertility. Practically the entire duchy lies in the basin of the River Moselle, which with its chief tributaries, the Our and the Sure, drains eastward. The climate is more changeable than that of Belgium and not as mild.

Industries. Most of the people are dependent on agriculture, over one-half of the total area being arable lands. Cereals and fruits, especially grapes, are extensively raised. Luxemburg also has rich deposits of iron, copper and lead, but only the iron mines are being worked on a large scale. Echternach and Diekirch have great blast furnaces, but Luxemburg, the capital city, is the chief manufacturing center. Besides pig iron and iron products the duchy is a large manufacturer of leather,

gloves, paper, malt and distilled liquors and sugar.

Government, Religion and Education. Luxemburg is a constitutional monarchy ruled under the constitution of 1848 as revised in 1856 and 1868. The chief power is in the hands of the hereditary grand duke (or duchess). The chamber of deputies, whose fifty-three elected members serve six years, passes the laws, which are usually introduced by the grand duke and must all be sanctioned by him. There is also an advisory council of state, appointed by the grand duke. The minister of state, who is the active executive, is assisted by directors of finance, justice and the interior, all appointed by the monarch. The government allows entire freedom of worship, but the whole population, except about 4,000 Protestants and 1,300 Jews, is Roman Catholic. Education is controlled by the state, and primary education is compulsory. Luxemburg has no university, but has a number of classical and other schools which offer suitable preparation for the universities of neighboring countries.

History. The country of Luxemburg, originally called Lützelburg, was one of the minor principalities of the Holy Roman Empire. It came into prominence in 1308, when Count Henry IV of Luxemburg became Holy Roman Emperor as Henry VII. Henry's grandson, Charles IV, also Emperor, raised Luxemburg to the rank of a duchy, and presented it to his half-brother, Wenceslas, whose descendants held it until 1437. After being owned by Austria and by Burgundy and then again by Austria, Luxemburg finally, in 1555, became the personal property of the kings of Spain, but remained a principality of the Holy Roman Empire. By the Peace of Utrecht, 1713, it was ceded to Austria, which lost it again when France conquered it in 1795. After the fall of Napoleon the Congress of Vienna created Luxemburg a grand duchy, made it a member of the Germanic Confederation, and gave it to William I, king of the Netherlands, in exchange for his ancestral estates of Nassau, which were taken by Prussia.

In 1831 attempts were made to incorporate Luxemburg into the new kingdom of the Belgiums. The powers, as usual, intervened, and declared that a part of the duchy must be left to the king of Holland. The king, however, declined to accept this arrangement until 1838, when the present boundaries were established. In 1866, when the old Germanic Confederation was dissolved, the Dutch king, William III, proposed to sell Luxemburg to France. This offer nearly caused war with Prussia, whose soldiers had garrisoned the duchy for fifty years. In 1867, by the Treaty of London, France, Prussia and Great Britain agreed to the independence and neutrality of Luxemburg; the Prussian soldiers, however, were not withdrawn until 1872.

Luxemburg remained a possession of the king of Holland until the death of William III in 1890. King William left no male heirs, and by the Salic law, which was still in force in Luxemburg, the throne of the grand duchy could not pass to a woman if any male heirs survived. Wilhelmina thus became queen of Holland, but a distant relative, Duke Adolf of Nassau (1817-1905), became grand duke of Luxemburg. With the death of Adolf's son, William Alexander (1852-1912), the male line of the house of Nassau came to an end, and the throne passed to his eldest daughter, Marie (born 1894). In August, 1914, on the outbreak of the War of the Nations, a German army demanded free passage through Luxemburg to France; the Germans seized the state railways and practically assumed control of the grand duchy, against the heated protests of Grand Duchess Marie and her government. The German government, however, promised reparation for any damage which might result from the invasion. E.D.F.

Consult Renwick's *The Grand Duchy of Luxembourg and Its People.*

LUXOR, *luk'saur.* See THEBES.

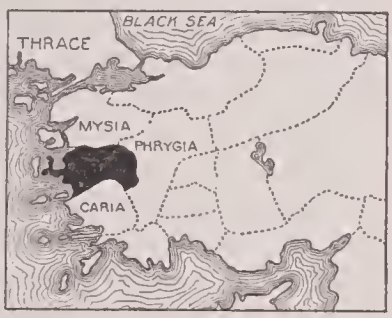
LUZON, *lu zon',* the largest of the three thousand islands of the Philippine group. For description, see PHILIPPINE ISLANDS.

LYCEUM, *li se'um,* originally a gymnasium of ancient Athens which received its name from the adjoining temple of the Greek god, Apollo Lyceus. It was used by Socrates, and at a later period by Aristotle and his disciples, who discussed their philosophy while wandering through the shady groves for which the place was noted. Modern usage applies the term to preparatory schools for young men, to lecture platforms, and, occasionally, to public halls and assembly rooms.

LYCURGUS, *li kur'gus,* according to tradition, was the author of the laws and institutions of ancient Sparta. He lived during the ninth century B.C., and was a son of the Spartan king Eunomus. In order to study the laws of other nations, he traveled extensively in Greece, Asia and Egypt, and upon his return to his native land he was requested by the

community to draw up a new code of laws. He thereupon remodeled the old constitution and established a new social order, which gave the people a voice in public affairs and led to the development of Sparta into a great military state. When this was accomplished, Lycurgus exacted a promise from his countrymen not to alter the constitution until he returned from a proposed journey. He then voluntarily exiled himself in order that the Spartans would be bound by oath to preserve intact and forever the laws he had introduced. The time and place of his death are unknown. Historians doubt the authenticity of some of this traditional account of his life, and some authorities regard him as a mythical personage. See SPARTA.

LYDIA, *lid'i a,* an ancient country in Asia Minor, famous for its fertile soil and its rich mineral deposits, especially the gold of the River Pactolus. The Greeks believed that the sands of this river produced the precious metal after the unhappy King Midas (which see) had bathed in its waters to rid himself of the touch that turned everything to gold. Lydia lay between the sea and Phrygia, on the west and east, and Mysia and Caria, on the north and south. In the seventh century B. C. it was an independent and prosperous kingdom, but in 546 B. C. the last king of the Lydians, the celebrated Croesus (which see), was conquered by Cyrus the Great. Thereafter the country was subject in turn to the Persians, the Greeks and the Romans. The Lydians are supposed to have invented the art of dyeing wool and of smelting and working ore. Their capital city was Sardis, near whose ruins may now be seen the straggling huts of a tiny village.



LOCATION MAP

LYELL, *li'el,* SIR CHARLES (1797-1875), a British scientist of the nineteenth century who is considered by many to be the founder of modern geological science. He was born at Kinnordy, Scotland, and educated at Oxford University. He was admitted to the bar, but soon abandoned the law to devote himself to geological research. After making several geological tours in 1824, and again in 1828-1830, he published his investigations in the *Transactions of the Geological Society.* Portions of his first important book, *Principles of Geology,* form the basis of the *Elements of Geology,* the sixth edition of which was published in 1865. In the *Antiquity of Man* he offers the theory that the race of man is much older than is generally believed. He was knighted in 1848, and was created a baronet in 1864. Lyell lent his influence to securing recognition for Darwin's theory of evolution, a system which he foreshadowed in his *Principles of Geology.* See EVOLUTION; GEOLOGY.

LYMPH, *limf,* a colorless fluid, which is in composition like blood but does not contain the red coloring matter (red corpuscles). From this fluid the body cells get nourishment, the lymph being first collected from the blood itself by an intricate process of filtration. The lymph not only nourishes the body cells but also collects impurities from them and thus assists in protecting the body from harmful influences.

Chyle. Lymph which has absorbed nourishment from the digested food in the intestine is called *chyle.* This is later poured into the blood stream and given to the body cells as food.

The Lymphatic System. Lymph is carried by its own special system of vessels, which are called *lymphatics.* These have their origin in fine vessels lying adjacent to the fine blood vessels; growing larger, they are called *trunks;* these trunks unite to form still larger vessels called *ducts.* The *thoracic duct,* the most notable example, carries the lymph and chyle from nearly the whole system of lymphatics and empties into the big vein under the collar bone. This thoracic duct is about fifteen to eighteen inches long, lies along the front of the spine and begins below with a dilated portion or reservoir, called the receptacle of chyle. It is about the size of a goose quill above its reservoir, or place where it receives the flow from its tributaries.

Lymphatic Glands are enlargements along the trunk of a lymphatic vessel, and are most thickly distributed in certain parts of the body, as the neck, the armpit and groin. They drain poison from the blood and near-by tissues in time of need and peril, thus protecting the body from harmful influences. S.C.B.

LYMPHATICS, *lim fat'iks.* See LYMPH, subhead *The Lymphatic System.*

LYNCHBURG, *linch'berg,* VA., a distributing and manufacturing center of importance, having exceptional transportation facilities through the service of the Norfolk & Western, Chesa-

peake & Ohio and Southern railways. It is situated southwest of the geographical center of the state, on the south bank of the James River and on the James River Canal. Richmond is 125 miles east and north and Washington, D. C., is 174 miles northeast. In 1910 the population, almost entirely American, was 29,491; it had increased to 32,940 in 1916 (Federal estimate). The area is four and one-half square miles.

Lynchburg has a picturesque location. The steep ascent from the river is broken into terraced hills, ornamented with fine trees and handsome residences, with Blue Ridge Hills and the Peaks of Otter in the background. About ninety acres of the city are assigned to its parks. Lynchburg has a number of fine educational buildings; its high school was erected at a cost of $125,000. One of the Randolph-Macon system of colleges is located here and occupies one of the most beautiful sites of the vicinity. Virginia Christian College, two business colleges and Jones Library furnish additional advantages for education. The Federal building was completed in 1914; this, and fine bank buildings, the Auditorium, Y. M. C. A. building and Masonic Home and Retreat are the conspicuous structures of the city.

Two dams constructed in the James River furnish water power for manufacturing purposes. The largest single industry is that of making shoes, though it was established here as recently as 1900. Next in importance is the tobacco industry, a superior grade of leaf being grown in this locality; coal, iron ore and granite are also found in this region. Among the other shipments are iron and brass products, cotton goods, plows, wagons, dyes, hardware, flour and lumber. The city has the largest bark extract wells in the United States, and the second largest flour mill in the South.

The first settlement was made in 1786, the town was incorporated in 1805, and it became a city in 1852. It was named for John Lynch, who inherited land here and in 1757 established a ferry across the James River. During the War of Secession Lynchburg was a base of supplies of some consequence for the Confederate army.

LYNCH LAW, a term originating in the United States and used to characterize capital punishment administered by mob violence without waiting upon the due processes of law. The origin of the phrase is said to be derived from the name of one Charles Lynch, a Virginia planter, who exceeded the limit of his power in punishing offenders, but this method of dealing with lawbreakers achieved greatest notoriety in the West during the pioneer days when civilization was years ahead of government. In California, particularly, following the discovery of gold, law-abiding citizens were forced to form *vigilance committees* to deal promptly with daring offenders against the peace of a community. The hanging of a man convicted by a group of citizens was called *lynching*. To-day the quick and orderly processes of the courts have deprived enraged citizens of all possible excuse for "lynch law," and public sentiment is sternly opposed to this method of punishment. In spite of this fact, however, an average of twenty-five lynchings occur every year; the victims are principally negroes. It is often difficult to secure the arrest and conviction of those involved in executing mob law, owing to local feeling against the victims.

LYNN, Mass., a leading center of shoe manufacture and an Atlantic seaport, located in Essex County, on Massachusetts Bay, ten miles northeast of Boston. It is served by the Boston & Maine and the Boston, Revere Beach & Lynn railroads, and by electric interurban lines. In 1910 the population was 89,336; in 1916 it was 102,425 (Federal estimate). Lynn has an area of eleven square miles, and extends for three miles along a splendid beach. The business section is on the lower ground about the harbor, the residence section occupying higher areas overlooking the bay. Interesting features of the city are an ocean boulevard, a state bathhouse, Lynn Woods (a beautiful park of 2,000 acres), Forest Park, Floating Bridge, a soldiers' monument, a handsome city hall, two hospitals and a public library.

There are large manufactories of boots and shoes (in which Lynn leads the world), morocco and leather, shoe manufacturers' supplies, electrical appliances, machinery, foundry and machine-shop products, boxes and patent medicines, their total annual production exceeding $75,000,000 in value. The making of boots and shoes began here in 1750. More than 20,000 persons are engaged in this industry, and the value of its annual output exceeds $50,000,000.

Lynn was settled in 1629 and was known as Saugus until 1637, when the present name was adopted from King's Lynn, England, the home of Rev. Samuel Whiting, pastor at Lynn from 1636 until his death in 1670. Lynn was incorporated as a city in 1850. A number of vil-

lages have been separated from Lynn, some of which have become fashionable summer resorts. The city adopted the commission form of government in 1910.

LYNX, *lingks,* the name of a group of the cat family, found in the northern parts of both hemispheres. A smaller species, known as the *bobcat,* is found as far south as Mexico. True lynxes are smaller than leopards and larger than ordinary wildcats. The fur, which grows even on the cheeks, is light brown or gray and very long and silky; sometimes it is spotted or striped with a darker shade. Lynxes have stumpy tails, and the pointed ears are tipped with tufts of fur. The pupils of the eyes contract to a narrow, black slit. These animals live in forests or in rocky places, and prowl at night. They kill sheep and chickens, but almost pay for them by the number of mice, rats and ferrets they destroy. They sleep in hollow trees or caves, but like to climb trees and lie stretched out on a limb. Young lynxes look like kittens, and the mother lynx will fight angrily and very cleverly against anything that approaches them. The beautiful fur is much in demand; because of this, and because of their raids on chickens and sheep, lynxes are being exterminated.

THE LYNX

These animals have been known by this name for hundreds of years. In Greek and Roman legends they were said to be able to see through the thickest walls, and the car of Bacchus, the wine god, was drawn by two huge lynxes.

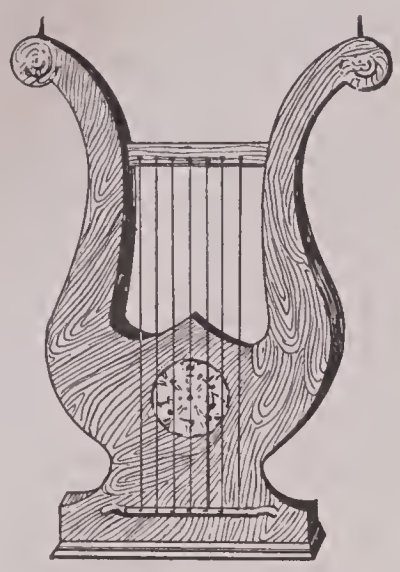
LYON, *li'un,* Mary (1797-1849), the founder of Mount Holyoke College, which was the first of the various women's colleges now maintained in the United States. She was born near Buckland, Mass., and at the age of seventeen began teaching in a common school for seventy-five cents a week "with board." Three years later she entered Sanderson Academy, continuing her studies in various schools for several years and teaching part of the time. In 1828 Miss Zilpah P. Grant, one of her former teachers, organized a seminary at Ipswich, Mass., choosing Mary Lyon as her associate. Six years later, when Ipswich Seminary failed in its efforts to secure an endowment, Miss Lyon started out to establish an institution which would offer a thorough education to young women of moderate means. Mount Holyoke College, with its advanced ideals, founded in 1837, was the result, and as its principal for twelve years, she did pioneer work in education which made her one of the famous women of the United States. In recognition of her services to American education she was in 1905 elected to the Hall of Fame (which see). See College, subhead *Colleges for Women.*

LYONS, *li'unz,* a great industrial city in the south of France, about fifty miles west of Lake Geneva, built upon a narrow, hilly strip of land between the Rhone and Saone rivers. It presents the unusual aspect of a modern manufacturing city and a medieval town. Along the river banks are busy docks and warehouses, for Lyons has the greatest silk industry in the world and has a large trade in coal, charcoal, metal and metal goods, wine, spirits, cheese and chestnuts. On the hill of La Fourviere are the chapels, churches and monasteries of the Lyons that was the medieval center of Christianity in the West. Here is the fifteenth century cathedral of Saint Jean; the Church of Saint Martin d'Ainay, which dates back to the ninth century; the Gothic church of Saint Nizier and the Hotel Dieu, that has never closed its doors to the poor since it was founded in the sixth century by Childibert.

Lyons was founded about 500 B. C. by Greek refugees. Under the Roman emperors it became a city of great wealth and importance, having fine temples, theaters, baths and aqueducts. In 478 Lyons was the capital of Burgundy; afterwards it fell into the hands of the Franks, and then the Saracens captured it. Charlemagne rescued it, then in the eleventh and twelfth centuries it became so prosperous that the neighboring cities began to quarrel about it, and the frightened citizens joined France for protection. During the Huguenot troubles, Lyons was mainly Catholic and suffered little harm, but in the French Revolution it was nearly destroyed. Fortunately the Germans did not injure Lyons in the Franco-German War, nor did the city suffer in the great War of the Nations which began in 1914. It has become the third in size and first in industry and manufacture of the cities of France. Population in 1911, 523,796.

LYRE, *lire,* a musical instrument of great antiquity, which originally had three strings. It consisted of a hollow body from which two

horns branched upward, carrying a crosspiece, or yoke. The strings, whose number varied from three to ten or more, were stretched between the yoke and the body. The sound was produced by striking the strings with the fingers. The lyre was the symbol of Apollo, the god of music and poetry, and was the favorite instrument among the Greeks for accompanying songs and recitations; from this use of the instrument the words *lyric* and *lyrical* are derived. As a musical instrument it is practically extinct, although it still survives in a crude form among the shepherds of Greece and certain barbarian tribes of Africa.



As great Pythagoras of yore,
Standing beside the blacksmith's door,
And hearing the hammers, as they smote
The anvils with a different note,
Stole from the varying tones, that hung
Vibrant on every iron tongue,
The secrets of the sounding wire,
And formed the seven-chorded lyre.
—LONGFELLOW: *To a Child.*

LYRE BIRD, one of the most remarkable of Australian birds. It receives its name from its beautiful and extraordinary tail, which in the male resembles the ancient lyre (which see). When erect, this tail is about two feet long, but it is not perfected until the bird has reached its fourth year. It is displayed to the best advantage while the bird is courting; in this respect it is like the peacock and the turkey. The nest is unusual; it is built on the ground, is well-woven and is dome-shaped, with an entrance on one side. Only one egg is deposited. These birds are sweet singers, rapid runners and good mimics. The size is about that of a small fowl, and the body plumage is somber.

LYRIC, *lir'ik,* **POETRY,** one of the three classes into which poetry is divided, the others being epic and dramatic poetry. Technically, a lyric is any poem which is intended to be sung to the accompaniment of a musical instrument, the name coming from the word *lyre;* but very many of the world's most beautiful lyrics were never intended to be set to music. More exactly, then, lyric poetry is the poetry of the emotions, as distinguished from that of action; and, as no emotions can be long sustained unchanged, most lyrics are comparatively short. Of the classes of lyrics the most important are songs, hymns, elegies, sonnets and odes, of which only the first two are specifically written to be sung.

Lyric poetry began in ancient times, almost all early verse having been written to be chanted, but there have been periods in the world's history when little, if any, was produced for its own sake, its only representative being the lyrical passages in narrative poems. The nineteenth century might almost be called the century of the lyric, for so many such masters of that form of verse as Wordsworth, Shelley, Keats, Tennyson and Swinburne had never been seen before. The world was ready to listen to narrative poetry, but preferred above all to find its own deepest emotions interpreted by these masters. Among the best lyrics in English are the *Lycidas* of Milton and the *Adonais* of Shelley (elegies);

THE LYRE BIRD

Keats's *On a Grecian Urn* and *Autumn;* Milton's *L'Allegro* and *Il Penseroso;* Wordsworth's *Sonnets;* the charming songs of Tennyson's *Princess;* Longfellow's *Hymn to the Night,* and Holmes's *Chambered Nautilus.* C.W.K.

Related Subjects. The reader is referred to the articles in these volumes on the masters of

the lyric form named above, and to the following additional articles:

Elegy	Poetry
Ode	Sonnet

LYSANDER, *li san' der* (? -395 B.C.), a Spartan warrior who was instrumental in bringing about the defeat of Athens in the Peloponnesian War. In 407 B.C., as commander of the Spartan fleet, he defeated the Athenians at the promontory of Notium, and in 405 B.C. was again victorious, overwhelming the Athenian fleet of 180 ships off Aegospotami. The following year the war came to an end with the surrender of the city of Athens. Lysander was killed at the Battle of Haliartus, in 395 B.C., while in command of an army sent against the Boeotians. His biography appears in Plutarch's *Lives.* See GREECE, subtitle *History.*

LYSIMACHIA, *ly si ma' ki a,* a group of plants belonging to the primrose family, containing about seventy species, nearly all of which grow in the northern hemisphere. Some scientists claim these plants were named for King Lysimachus of Thrace; others, that their name is derived from Greek words meaning *loose* and *strife. Golden loosestrife,* a familiar resident of the fields and roadsides of New England and the Middle states, is an old-time garden plant naturalized from Europe. Its leaves are lance-shaped and the flowers are yellow and five-pointed, borne in the axils of the upper leaves. *Moneywort* and *creeping Charlie* are the common names for the *creeping loosestrife,* a trailing vine which is always green. It is also a rampant grower and will crowd out the grass whenever opportunity offers. Moneywort is an admirable plant for hanging baskets. Japanese lysimachia, which bears white flowers, is an attractive plant for borders and also produces flowers for cutting.

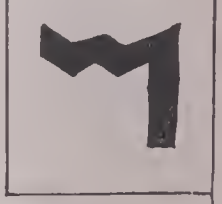
LYSIPPUS, *li sip' us,* a Greek sculptor who introduced great changes in the accepted rules for the proportions of the human figure. He claimed to represent the figure as it seems to be to the eye and not as it actually is. He worked only in bronze, and his statues were characterized by small heads, long legs and extremely slender figures. Lysippus's professional activity falls between the years 372 and 316 B.C., during which time he produced over fifteen hundred statues, including many studies of Alexander the Great. Among the best examples of his art still in preservation are two bronze statuettes of *Neptune* and *Jupiter* and the larger bronze of *Hercules* in the British Museum, London.

LYTTON, *lit' un,* EDWARD GEORGE EARLE LYTTON-BULWER. See BULWER-LYTTON, EDWARD GEORGE EARLE.

LYTTON, EDWARD ROBERT BULWER (1831-1891), the second Lord Lytton, an English diplomat, politician and poet, was born in London, and was the son of the famous novelist, Bulwer-Lytton. Notwithstanding the activities of a brilliant political career, Lord Lytton, under the pen name of *Owen Meredith,* produced much poetry and prose of a high order, including the ever-popular *Lucile, Orval, or The Fool of Time,* the only representation in English of the great Polish poetical school, *Clytemnestra and Other Poems, Tannhäuser* and *The Life and Letters of Edward Bulwer, Lord Lytton.*

THE WORLD BOOK
ORGANIZED KNOWLEDGE IN STORY AND PICTURE
TRADE MARK REGISTERED

Mm



M is the thirteenth letter of the English alphabet. It is an interesting letter, because it has come down from the Phoenician with so little change in form or sound. The name of the original letter was *mem,* which meant *water,* and the character was a wavy line, which represented water in motion. The Greeks and Romans gave to the *m* the same value as the Phoenicians, and all through the centuries the letter has been singularly free from confusion with other letters, from which so many of the consonants have suffered. *M* is a liquid, or semivowel, and has only one sound. In a few foreign words, such as *mnemonic,* it is silent.

M is very commonly used as a symbol to mean *one thousand.* As an abbreviation it may stand for *mile* or *meter,* although the former is usually written *mi.*

MAARTENS, *mahr'tenz,* Maarten (1858-1915), the pen name of J. M. W. van der Poorten-Schwartz, a Dutch novelist whose writings give an accurate picture of middle-class life in his native country. He was born in Amsterdam, but spent his early boyhood in England. Later he was educated in the public schools of Germany, and he also studied law at the University of Utrecht. Strangely enough, Maartens wrote his novels in English rather than in his native tongue; and only because he did not wish to trust his books to strange translators did he at any time consent to having them published in Dutch. All of his works have been successful and popular. *The Sin of Joost Avelingh,* his first novel, was published in 1889. Among the others are *An Old Maid's Love, A Question of Taste, God's Fool, The Greater Glory, Harmen Pöls, Price of Lis Doris* and *Eve.* Maartens died August 4, 1915.

MABIE, *ma'be,* Hamilton Wright (1846-1917), an American editor, essayist and lecturer who has been a potent force in behalf of culture and character forming. His death marked the close of thirty-seven years of editorial connection with *The Outlook,* thirty-two of which he spent as assistant editor of that periodical. He was born in Cold Spring, N. Y., and was educated at Williams College and the law school of Columbia University. In 1879 he joined the staff of *The Christian Union* (later *The Outlook*), and in the years that followed he contributed to that journal hundreds of literary reviews and talks on social and ethical subjects. He also became widely known as a lecturer, especially as a speaker before audiences of college men and women. As an American exchange professor in Japan he did much to strengthen the friendship between the two countries. Mr. Mabie is perhaps most widely known as an interpreter of literature and of the spiritual life, but he has published some excellent books for young readers. These include *Myths Every Child Should Know, Fairy Tales Every Child Should Know* and *Legends Every Child Should Know.* Among his other writings are *My Study Fire; Essays in Literary Interpretation; Nature and Culture; American Ideals, Character and Life;* and *Japan, To-day and To-morrow.*

MACADAM, *ma kad'am.* See Roads and Streets.

McALESTER, *ma kal'es ter,* Okla., the county seat of Pittsburg County, is situated in the southeastern part of the state, at the junction of the Missouri, Kansas & Texas and the Chicago, Rock Island & Pacific railways. Oklahoma City is 120 miles northwest, and

Fort Worth, Tex., is 191 miles southwest. The first settlement was made in 1872, and was named for J. J. McAlester, its founder. The cities of McAlester and South McAlester were consolidated and incorporated as McAlester in 1907; the commission form of government was adopted in 1910. From 12,954, in 1910, the population increased to 18,504 in 1916 (Federal estimate). The area is five and a half square miles.

The region in which McAlester is located is a rich farming and stock-raising country. Immense deposits of coal are found near by, and coal-mining and coke-making are the principal industries. The city has a large wholesale and jobbing business, especially in hardware and groceries. Among the notable buildings are the state penitentiary, the Federal building, erected in 1915, the Masonic Temple and the Carnegie Library.

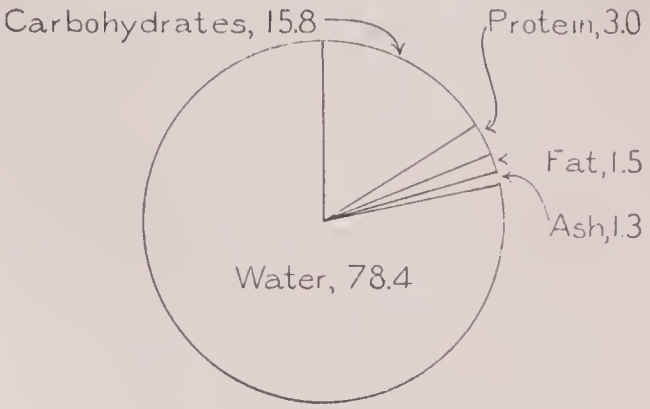
MACARONI, *mak a ro' ni,* an article of food composed of paste or dough made from the best qualities of a hard variety of wheat containing a large percentage of gluten. It was formerly an exclusive product of Italy, but is

DRYING MACARONI IN NAPLES

In Italy such a scene as the above is common. The macaroni eaten in America is nearly all of home manufacture, under proper sanitary conditions.

now also made in France and in America. The wheat is first ground into a coarse meal, from which the bran is removed, after which it is mixed with hot water and worked up into a dough. In this state it is called Italian paste. It is then placed in a vertical brass cylinder perforated with holes, the size of which regulates the size of the macaroni tube. The dough is forced through these holes by hydraulic pressure, cut off into lengths of about three feet and dried in the sun or by low heat. This modern and sanitary method of making macaroni has replaced the former laborious hand process. Italian paste is also made into a threadlike product called *vermicelli,* and into larger cords known as *spaghetti.*

Macaroni is an important article of food in Italy, especially in Naples and Genoa, and it is exported from that country in large quantities to all parts of the world. Over 500,000 boxes are sent annually to the United States,



COMPOSITION OF MACARONI

Its fuel value is only about 400 calories per pound, when ready for the table, ranking below the poorest parts of beef and pork, nearly equal to bananas, but much above tomatoes and pumpkins.

and about 70,000 to London. As macaroni is rich in starch, it should not be served with potatoes. A favorite way of cooking it is by first boiling, then sprinkling with cheese, and baking; in this form it is known as *macaroni au gratin.* S.L.A.

MACAULAY, *ma kaw' li,* Thomas Babington (1800-1859), an English statesman and author, born at Rothley Temple, Leicestershire. He was a very remarkable child, for he read easily at the age of three, and from the age of seven busied himself writing history and poetry. By means of his extensive reading and a course in a private school, he was prepared to enter Cambridge in 1818 and to win distinction as a writer and a debater. In 1824 he was made a fellow of Trinity College. The next year he studied law, and in 1826 was called to the bar, but did not practice long before giving up this vocation because of his decided leaning to literature. During his college days he had published a number

THOMAS B. MACAULAY

His command of expression was proportioned to the extraordinary compass of his memory.

of poems and essays, and in 1825 had contributed to the Edinburgh *Review* his essay on Milton, which had been received with enthusiastic praise. Thus his literary career opened with most promising prospects, and his popularity kept on increasing until his death. The essay on Milton was followed by a long series of magazine articles, on a variety of subjects, and Macauley became the most widely read essayist of the age.

In 1830 he entered Parliament, became prominent as an ardent Whig and eloquent debater, and helped in securing the passage of the great Reform Bill in 1832, abolishing the so-called "rotten boroughs." After a period of absence in India as a member of the supreme council there, he was again returned to Parliament, where he served at intervals during nearly all the remainder of his life. In 1842 was published his *Lays of Ancient Rome,* a book of ballads based on Roman legends and remarkable for their vigorous, swinging meter. *Horatius at the Bridge,* one of the *Lays,* is known and liked by almost every schoolboy. Six years later were issued the first two volumes of his greatest work, *The History of England from the Accession of James II.* The effect produced by these books was unique. They were welcomed not only by scholars but by the entire reading public, who found in them the entertaining style and the thrilling narrative which they expected only from novels. The history sold by the thousands, not only in Great Britain but in the United States. The third and fourth books were even more eagerly received, and it is said that in the United States the sale of copies was exceeded only by that of the Bible. There have been few authors who have enjoyed such popularity during their lifetime. In 1857 Queen Victoria recognized his ability and his services by creating him Baron Macaulay of Rothley. Two years later, after a long period of ill health, he died suddenly, leaving his great history unfinished.

Macaulay's style is regarded as a model of clearness and grace. It has had many imitators, but no one of them has approached the original. In value of content, however, his essays and histories do not compare with those of accurate and philosophical present-day writers. His love for vividness and picturesqueness in his presentation led him into a coloring of facts, and his Whig tendencies were so pronounced that he often did injustice to other parties. Nevertheless he must always be remarkable for his great breadth of learning and for his ability to gain and hold the interest of his readers. A.MC C.

Consult McMaster's "Thomas Babington Macaulay," in *Warner Classics.*

MACAW, *ma kaw',* one of a species of large, gorgeous, strong-flying parrots, mostly found in South America, although a few reach as far north as lower Central America. Among the best-known species are the *great scarlet macaw,* the *red* and *yellow, green-winged macaw* and the *green macaw.* The distinctive features of this bird are long, pointed wings, naked cheeks, a short, arched bill and a very long, wedge-shaped tail. They are easily domesticated, but as their natural notes are harsh and piercing, and they do not learn to use words readily, and cannot be taught not to scream, they make undesirable pets.

MACAW

Macaws are usually seen in pairs, flying and feeding close together. Their eggs, which seldom exceed two in number, are laid in the hollows of trees; they feed chiefly on seeds and fruits and sometimes cause great damage in fields of grain. When domesticated, they readily eat bread and sugar.

MACBETH, *mak beth'* (? -1057), a king of Scotland whose seventeen years' reign is chronicled as a time of plenty. In a revolt in 1040, Macbeth slew Duncan, then the Scottish king, and seized the throne. Duncan's sons at once fled to England, and in 1054, with their Uncle Siward, Earl of Northumbria, led an army into Scotland against Macbeth. An indecisive battle was fought near Scone; it was not until 1057 that Macbeth was finally defeated and slain at Lumphanan, in Aberdeenshire.

The Tragedy, "Macbeth." Shakespeare, using as a basis one of the stories in Holinshed's *Chronicles of England, Scotland and Ireland,* and investing the tale of Macbeth and Duncan with the glow of imagination, produced in the tragedy Macbeth one of the greatest plays of all time. This drama is historical only in that it is founded on the murder of King Duncan by Macbeth. It is due to the poet's genius that we read in this masterpiece of dramatic writing the story of a soul's degradation; it is

a tragedy of life, a picture of the downfall of one who yielded to the voice of over-reaching ambition. From the meeting of Macbeth and the witches on the lonely heath, in the first act, an element of the supernatural pervades the play. The witches are symbols of evil suggestion, for they stimulate in Macbeth the lust for power that is to ruin him, and it is from them that he receives the suggestion that Banquo stands as an obstacle in his path. The subsequent murder of Banquo and the appearance of his ghost at the feast mark the climax of the play. Macbeth has given himself over entirely to the forces of evil, but from this point on he pays the price of his crimes.

Probably the spiritual struggle of Lady Macbeth holds as much interest for the reader as that of her husband. She shows greater strength of purpose in the beginning than he; it is to her that Shakespeare gives the oft-quoted lines—

> We fail!
> But screw your courage to the sticking-place,
> And we'll not fail.

Yet she seems to have possessed the finer nature, for her mind gives way under the burden of her guilty secret, and in the pathetic sleep-walking scene she cries despairingly—

> Out, damned spot! out, I say! * * * * * What, will these hands ne'er be clean?
> * * * * * Here's the smell of the blood still: all the perfumes of Arabia will not sweeten this little hand.

Shakespeare is supposed to have written the play in 1606. It first appeared in print in the folio of 1623. The rôles of Macbeth and Lady Macbeth have been portrayed by some of the greatest actors. R.D.M.

McBRIDE, Sir Richard (1870-), a Canadian barrister and statesman, for twelve years premier of British Columbia. Sir Richard is one of the men who have played a leading part in the development of the Pacific province. Political opponents have found fault with his policies and his occasional arbitrary actions, but even they admit the progress made by British Columbia between 1903 and 1915, the years during which he was in control. Economic development of the province, especially through financial assistance to railways, was one of his cardinal principles.

McBride was born at New Westminster, B. C., attended the public schools of that city, and later attended Dalhousie University, at Halifax, N. S. He was called to the bar in 1892, and for six years practiced his profession at Victoria, B. C. Entering the provincial legislative assembly in 1898 as a Conservative, he quickly won a high place in political life. In 1900 he assumed the position of minister of mines in the Dunsmuir administration, but resigned after a year because of a disagreement with his chief. In 1902 the Conservatives chose him to lead them in opposition, and in 1903 he was appointed provincial premier and minister of mines. During the next twelve years occasional reorganizations of the ministry were necessary, but McBride succeeded in maintaining his leadership. It was generally assumed that he would continue indefinitely in active politics, but in 1915 he resigned the premiership, and temporarily, at least, withdrew from politics to become provincial commissioner to Great Britain, with headquarters at London.

MACCABEES, *mak'a beez,* a Jewish dynasty of heroes who were credited with being the deliverers of Judea and Judaism from the persecutions of the Syrian king, Antiochus Epiphanes. The original name of the family was *Hasmoneans.* It consisted of the aged Matthias and his five sons, who led a rebellion against the oppressing Syrians, conquered and killed many of their tribes and destroyed their pagan altars. Matthias died in 167 B. C., and was succeeded by his son Judas, to whom alone, according to the Scriptures, properly belongs the surname *Maecabaeus,* and who by his heroism and loyalty to the faith of his fathers was responsible for this illustrious period of Jewish history. The fraternal order, the *Maecabees of the World* (which see), was named for this dynasty.

MACCABEES OF THE WORLD, Knights of, a fraternal and benevolent society to which all white male persons of sound health and good character, between the ages of eighteen and seventy, are eligible. Its name was derived from the Biblical Maccabees (see Maccabees). The order was founded at London, Ontario, in 1878 and reorganized in 1883. Its headquarters, known as the Supreme Tent, are now located at Port Huron, Mich. Between the meetings of the governing body, which take place once in three years, the affairs of the society are administered by a board of seven trustees. The purpose of the order is to provide social and fraternal intercourse among its members and benefits in the way of insurance to the families of deceased members. Since its organization the society has disbursed over $53,000,000 in benefits. The membership in September, 1916, was 316,575. Prior to 1904 the association was known as *The Knights of the Maccabees.*

McCARTHY, *ma kar'thi,* Justin (1830-1912), a writer, lecturer and statesman, whose literary

productions are concerned chiefly with the England of his own day. He was born in Cork, Ireland; became a reporter on the Cork *Examiner* in 1847, then found his way to London, the land of promise of every journalist, and became successively Parliamentary reporter, leader writer and editor. His novel, *Dear Lady Disdain,* published in 1871, met with great success. Into this novel, as well as *Mononia* and *My Enemy's Daughter,* he put a good deal of his early life and its local associations. His unadorned English is warm with human sympathy, persuasive in narrative and full of subtle humor. He was prominent as a member of Parliament, and led the Home Rule party after Parnell's overthrow. In *The Ladies' Gallery* and *The Right Honorable* he developed his plots against a background of Parliamentary life. His crowning success in the field of literature is *A History of Our Own Times,* appearing in successive volumes. It became popular in America as well as in England, and is his literary monument. His other historical works are *History of the Four Georges* and *The French Revolution.* His novels include *Miss Misanthrope, A Fair Saxon, Lady Judith, The Maid of Athens* and *Paul Massie.* The *Story of Gladstone's Life* is one of his best-known biographies.

McCLELLAN, *ma klel'an,* GEORGE BRINTON (1826-1885), a leading general with the Union forces during the early part of the War of Secession, and one of the few great military men who sought the Presidency unsuccessfully. He was born at Philadelphia, December 3, 1826, was graduated from West Point in 1846, and served as an engineer in the Mexican War; for splendid service in that struggle he was appointed a captain. After the war the government commissioned him to make extensive surveys in the West for a proposed Pacific railroad, and in 1855 sent him to Europe to study the organization of armies. For three years he held offices as vice-president of the Illinois Central Railroad and general superintendent and president of the Ohio & Mississippi's eastern division.

GEORGE B. McCLELLAN

At the beginning of the War of Secession McClellan was appointed major-general. As a military leader and organizer he was remarkably successful, but his lack of aggressiveness and slowness of movement were sharply criticized, and when, after the battle with General Lee at Antietam, Md. (see ANTIETAM, BATTLE OF), McClellan failed to follow up the enemy, his command was taken from him. In 1864 as Democratic candidate for President against Lincoln he was defeated. Thirteen years later McClellan served one term as governor of New Jersey. Among other works, he wrote the *Manual of Bayonet Exercise* and *Report on the Organization and Campaigns of the Army of the Potomac.*

McCLURE, *ma kloor',* SAMUEL SIDNEY (1857-), an American editor and publisher, founder of the publishing house and newspaper syndicate that bears his name. He was born in Frocess, County Antrim, Ireland, and emigrated to America with his parents in childhood, settling in Illinois. In 1882 he was graduated from Knox College, and edited the *Wheelman,* for bicyclists, in Boston until 1884. In that year he established the McClure Syndicate in New York, the first organization of its kind to adopt the system of buying manuscripts from authors and selling them for simultaneous publication in various newspapers. He began the publication of *McClure's Magazine* in 1893, and under his editorship it soon reached the front rank among American periodicals.

In 1899 he established the publishing house of McClure, Phillips & Company, the partnership ending when Doubleday, Page & Company acquired the book business, and the McClure Syndicate took over the magazine. The S. S. McClure Newspaper Corporation was formed in 1915, when the New York *Mail,* of which Mr. McClure became editor, was purchased. He has been a trustee of Knox College, Galesburg, Ill., since 1894. He was for a time at the head of the Montessori Association, formed for the purpose of introducing the Montessori system of child training into the United States, and it was largely due to him that Madame Montessori engaged in her American lecture tour of 1913-1914. A frank and interesting story of the publisher's life, from his own pen, appeared in serial form in his magazine in 1915.

McCORMACK, *ma kor'mak,* JOHN (1885-), an Irish tenor who has acquired fame in concert tours in Europe, America and Australia. He was born in Athlone Westmeath. It was

not until after he had completed his college education that he learned he was gifted with a voice of unusual quality. One eventful day he won first prize at a Dublin musical festival, and then he awakened to a realization of the possible career before him. The success of a few concerts enabled him to begin his studies in Italy. Later he appeared in concerts in many Italian cities. Returning to London in 1907, he made his debut at Covent Garden, where he scored a triumph with Mme. Tetrazzini in *Rigoletto*. He has since appeared in leading rôles in many noted operas, and has also won fame in Irish songs.

JOHN McCORMACK

McCORMICK, *ma kor' mik,* CYRUS HALL (1809-1884), an American whose genius developed the first of the great labor-saving machines which gave cereal growing a remarkable impetus. It has been said that owing to the invention of the reaping machine, which he produced in 1831, the line of civilization moved westward thirty miles each year. He was born in Walnut Grove, Va., and the small country school was the only formal educational advantage he ever enjoyed. In 1845 he removed to Cincinnati, and two years later to Chicago, where extensive works for building his reapers were established. By that time the machines were being sent to all parts of the world.

CYRUS H. McCORMICK

The McCormick factories perfected the reaping machine step by step, keeping pace with the active competition which inevitably developed, and in 1902 they were included in the consolidation of leading reaping and binding machine companies which became known as the International Harvester Company.

Many prizes and medals were awarded this pioneer inventor, and the French Academy of Science made him a member when he was nearly seventy years old. He founded the McCormick Theological Seminary of the Presbyterian Church in Chicago, endowed a professorship in Washington and Lee University and gave liberally to charitable and religious institutions. See REAPING MACHINE; INVENTION.

McCUTCHEON, *ma kuteh' en,* GEORGE BARR (1866-), a popular American author whose stories, most of them adventurous romances, have been among the most widely read volumes of modern American fiction. He comes of a talented family, and was born and spent his boyhood on a farm in Tippecanoe County, Ind.; his brother John is a famed cartoonist (see below). After attending Purdue University, he became, in 1889, a reporter on the Lafayette *Journal,* and four years later was made city editor of the Lafayette *Courier.* Between the years 1901 and 1913 he published more than twenty books, all of which had an immense sale. Among them are *Graustark, Castle Craneycrow, Brewster's Millions, Nedra, The Purple Parasol, Cowardice Court, Truxton King, The Rose in the Ring, Mary Midthorne, A Fool and His Money, The Prince of Graustark* and *Mr. Bingle.* He has also contributed a number of short stories to magazines.

McCUTCHEON, JOHN TINNEY (1870-), an American newspaper artist and correspondent, famous as a cartoonist for the Chicago *Tribune* since 1903. Earlier in his career he was employed by the Chicago *Record* and the Chicago *Record-Herald.* His work is very popular, and his cartoons have been called "pen-and-ink sermons." He takes his topics mainly from the commonplace incidents of life, instead of portraying solely political issues and unkindly caricaturing public men. He has the rare genius of aiming his cartoons at human foibles and weaknesses. His popular series of *Bird Centre* cartoons added much to his fame as a caricaturist of human nature. His cartoon, *Indian Summer,* was so well received that it has been reprinted in the *Tribune* several times by request. Among his most famous sketches are *The Cartoons That Made Prince Henry Famous.* Mr. McCutcheon was sent to Europe as war correspondent for the *Tribune* in 1914 and again in 1915. In 1917 he purchased a small island among the Bahamas, named Salt Cay, realizing in this transaction a boyhood dream. Early in the same year he married Miss Evelyn Shaw, of Chicago. He is a brother of George Barr McCutcheon (see above).

MACDON'ALD, GEORGE (1824-1905), a Scottish poet and novelist, called "the apostle of the spiritual meaning of life." He was the author of a long list of novels, notably *David Elginbrod, The Seaboard Parish, Robert Falconer, Malcolm* and *What's Mine is Mine*, in all of which the story interest is secondary to the spiritual element. He also published several books of verse, and was particularly successful in his stories for children, of which *The Princess and the Goblin, Dealings with Fairies* and *At the Back of the North Wind* rank with the best ever written. Macdonald was born at Huntley, Aberdeenshire, and was educated at Aberdeen University. Later he studied for the ministry, but on account of ill-health gave up the idea of becoming a preacher. His novels, which are full of the quaint dialect of the people of Aberdeenshire and the Northeastern counties, show his deep insight into Scottish character. In 1872 he lectured in the United States and Canada.

MACDONALD, SIR HUGH JOHN (1850-), a Canadian barrister and statesman, son of Sir John A. Macdonald, the first premier of the Dominion. The son was educated at Queen's College, Kingston, and at Toronto University, from which he was graduated at the age of nineteen. He then studied law, was called to the bar, and practiced law in Toronto from 1872 to 1882, when he removed to Winnipeg. There he began to take part in public affairs, and in 1891 was elected as Conservative to the Dominion House of Commons. In 1896, during the brief service of the Tupper Ministry, Sir Hugh was Minister of the Interior. Later he was chosen leader of the Manitoba Conservatives, and in 1899-1900 was premier of the province. His term of office was not an eventful one, and in 1900 he resigned in order to reënter Dominion politics. He was, however, defeated for election to the House of Commons, and returned to his law practice. Nevertheless he maintained his interest in politics, and continued to stand high in the Conservative ranks, and at least on one occasion led the party in a general election in which defeat was a foregone conclusion. On December 12, 1911, Sir Hugh was appointed a police magistrate of Winnipeg.

MACDONALD, JAMES ALEXANDER (1862-), a Canadian clergyman, editor and publicist, for many years known as the editor of the Toronto *Globe,* which he made one of the most powerful journals in Canada, but in recent years conspicuous as an advocate of arbitration in international disputes. Not merely with the pen but with the tongue Dr. Macdonald spread his views until he became one of the most famous religious and political speakers in America.

Macdonald was born in Middlesex County, Ontario, and was educated at Edinburgh University and at Knox College, Toronto. In 1891 he was ordained a Presbyterian minister, and in the same year became pastor of a church at Saint Thomas, Ont. After five years he removed to Toronto, to become editor of the *Westminster,* a monthly journal of a religious character. He afterward served as editor of the *Presbyterian,* a weekly paper. At the same time, from 1896 to 1901, he was principal of the Presbyterian Ladies' College. In 1902 he assumed the editorial direction of the Toronto *Globe,* through which he became one of the best known and most influential molders of public opinion in Canada. He continued his activity along religious lines and served as a member of the committee on union of the Presbyterian, Methodist and Congregational churches of Canada. After 1911, and more especially after 1915, when he resigned as editor of the *Globe,* Dr. Macdonald gave much of his time to lecturing and writing about international peace, both in Canada and the United States, and quite aside from the fact that after 1911 he was a director of the World's Peace Foundation, was without question the foremost Canadian advocate of arbitration.

MACDONALD, SIR JOHN ALEXANDER (1815-1891), a Canadian statesman, the first Premier of the Dominion and for a generation the dominant figure in Canadian public life. The career of Sir John Macdonald cannot be studied apart from the history of Canada. He was in some respects the typical Canadian public man of his day—ambitious, energetic, independent, occasionally forgetful of the methods he adopted to secure legitimate needs. What is looked upon as the greatest mistake in his career is the Pacific railway scandal, yet even in this case he did not personally profit. Allowance should be

SIR JOHN A. MACDONALD

made, too, for the many difficulties he had to meet. Few political leaders of any age have had so many opposing elements to reconcile, so many factions to hold together. The man who could rule a mixture of zealous factions, including "Irish Catholics and Orangemen, French and English antifederationists and agitators for independence, Conservatives and reformers, careful economists and prodigal expansionists," was manifestly a man of unusual power.

Sir John was a consummate leader, a man of great personal magnetism and striking physical appearance. In features he greatly resembled Benjamin Disraeli. He had a keen insight into the workings of the human mind, a gift which he utilized to secure personal popularity among the mass of the people as well as the leadership of any group in which he worked. In the old Canadian assembly and its successor, the Dominion Parliament, he held a unique place, which is perhaps sufficiently indicated by the fact that his first service as Premier of Canada began in 1857, and his last continued until his death in 1891.

Youth and Early Career. Macdonald was born in Glasgow, Scotland, on January 11, 1815. When he was five years old his parents took him with them to Canada. They settled at Kingston, Ont., where their son spent his boyhood, studied law and in 1836 was called to the bar. He practiced at Kingston until 1844, when he was elected to the assembly as a Conservative. In a sentence of his first public address he struck the keynote of his career: "I therefore need scarcely state my firm belief that the prosperity of Canada depends upon its permanent connection with the mother country, and that I shall resist to the utmost any attempt (from whatever quarter it may come) which may tend to weaken that union."

During his first years in the assembly his voice was heard infrequently. He devoted most of his time to perfecting his knowledge of parliamentary practice, and no less important, to a study of the men with whom he was now brought into contact. As a result he became perhaps the most skilful party manager and the ablest parliamentarian in the history of Canadian politics. His speeches were infrequent, but his abilities won prompt recognition, and in 1847 he acted as receiver-general and later as commissioner of crown lands. From 1848 to 1854 the Conservatives were in opposition, but in the latter year Macdonald again took office as attorney-general in the Cabinet formed by Sir Allen MacNab and Auguste Morin. As attorney-general it fell to Macdonald to dispose of two vexing problems, clergy reserves and seigniorial tenures, which had long been important. During these years Macdonald recognized and accepted three principles which thereafter guided his policy—first, the maintenance of Canadian union with Great Britain; second, a tariff for the protection of domestic industries; and, third, a union of the British colonies in North America. The union of the colonies was established to a considerable degree through Macdonald's influence, and the other two principles still guide Canadian statesmen.

A Decade of Preparation, 1857 to 1867. Until 1857 Macdonald held only subordinate Cabinet positions, although in several Ministries, notably that formed by Sir Etienne Taché in 1856, he was the real head of the government. Between 1857 and 1867 Macdonald was several times Premier, first jointly with Sir Georges Cartier, and later again with Taché. During this period British Columbia became (1858) a crown colony, Ottawa was chosen (1858) as the capital of Canada, the decimal system of currency was adopted (1858), the famous Victoria bridge at Montreal was completed (1860), and the Trent affair (1861) and the Fenian invasion (1866) caused great excitement.

Far more important than any of these events was the growing consciousness among Canadians that the legislative union of the two Canadas could last no longer. The alternative was Confederation, the union of all the British colonies in North America. The Fenian Raid, the Trent episode, the lesson of unity learned from the War of Secession in the United States, added to the impossibility of securing effective government under the Act of Union, turned the thoughts of statesmen to a larger Canada.

At last in 1864, after the Taché-Macdonald Ministry was again defeated, a coalition Ministry was formed with a view to securing a union of the provinces. For this coalition the chief credit is due to George Brown, the Liberal leader, who renounced the strongest personal dislike of Macdonald and accepted a place in the Ministry. Macdonald, Brown and Cartier were sent as delegates to the Charlottetown Conference in 1864, the result of which was the Quebec Conference, a month later. The most prominent figure in the conference was unquestionably Macdonald, who became, three years later, the first Premier of the new Dominion of Canada.

Organization and Expansion. The difficulties of organizing the Dominion called for infinite tact and resource on the part of Macdonald. The jealousies of the provinces had to be smoothed over, yet the rights of the new Dominion had to be maintained. Sir John (he was created Knight Commander of the Order of the Bath in 1867) was strongly in favor of the aggressive assertion of the rights of the new Dominion, but in the principal legal battle, the Ontario-Manitoba boundary question, which this position caused, he was defeated. The North West Territories were secured by purchase of the Hudson's Bay Company's territorial rights, and Manitoba was organized as a province. Sir John went to Washington, D. C., in 1870 as one of the commissioners to settle the Alabama case and the fisheries dispute, and was one of the signers of the Treaty of Washington in 1871. The construction of the Canadian Pacific Railway, which was one of the most important projects in which the government was concerned, cost Sir John the Premiership in 1873, when it was learned that the Conservative party had accepted money from the railway's promoters for use in election campaigns. Public indignation compelled Sir John's resignation, although it was known that he had not personally profited.

During the next five years Canada, like the United States, suffered from severe industrial depression. The Conservatives seized the opportunity of the elections of 1878 to offer a protective tariff as the first remedy for depression. Their "national policy," as it was popularly called, won the voters' approval, with the result that Sir John again became Premier and served until his death in 1891. During these years the record of Sir John's life is practically the history of Canada. Most of his efforts were directed to the organization and development of the great Northwest. He immediately took up again the question of a transcontinental railway, and discarding the Liberal policy of government construction, contracted with a syndicate of capitalists to complete the work. The Canadian Pacific Railway was completed in November, 1885. In the same year occurred the Saskatchewan or North West Rebellion, which was the direct result of westward expansion (see SASKATCHEWAN REBELLION). Sir John's last public appeal, in the elections of 1891, was to the voters to defeat the proposed Liberal program of trade reciprocity with the United States. The excitement and anxiety of the contest brought on a stroke of paralysis, which caused his death, on June 6, 1891. His widow was created Baroness Macdonald of Earnscliffe, Earnscliffe Hall being the name of the Macdonald home in Ottawa. G.H.L.

Consult Pope's *Memoirs of Sir John Alexander Macdonald;* Parkin's *Sir John A. Macdonald,* in The Makers of Canada Series; Biggar's *Anecdotal Life of Sir John Macdonald.*

MACDONALD, JOHN SANDFIELD (1812-1872), a Canadian statesman, Premier of Canada from 1862 to 1864, and from 1867 to 1871 first premier of the province of Ontario, a man who is conspicuous in Canadian history for his independence of party ties. Even as a boy he displayed his independence by running away from home on more than one occasion when parental discipline seemed to him unjust or too stern. For a number of years he worked as a clerk in a store at Cornwall, Ont., but being dissatisfied with his prospects there, began the study of law. He was called to the bar in 1840, and a year later began his public career as a member of the Canadian assembly. He became the leader of the reform party, but his party allegiance was uncertain when mere names were at stake. Though originally elected as a Conservative, he was solicitor-general for Upper Canada in the Liberal Baldwin-Lafontaine Ministry from 1849 to 1851, and in 1858 again accepted a place (attorney-general) in the Liberal Brown-Dorion Ministry. From 1852 to 1854 he was speaker of the assembly.

On most public issues Macdonald was a Liberal, but he was one of the few Upper Canadians who opposed "representation by population," one of the Liberal planks for a generation. On many occasions he voted with the Tories, yet he never attended a Tory meeting or had intimate alliance with that party's leaders. Although a Roman Catholic, he was never an advocate of separate schools. From 1862 to 1864 he was Premier. His Ministry was not a strong one, and was succeeded by a Conservative one headed by Sir John A. Macdonald, who was not related to John Sandfield. The latter opposed Confederation, but after the passage of the British North America Act became its loyal supporter. In 1867 he was called on to organize the provincial government of Ontario. During his Ministry were established the provincial agricultural college and many of the other public institutions of the province. After four years, during which the government was operated efficiently and economically, Macdonald resigned the Premiership and retired from public life.

MACDONALD, Sir William Christopher (1831-), a Canadian capitalist and philanthropist, who endowed the Macdonald Agricultural College and Normal School and also gave liberally to other educational and charitable institutions. Sir William was born at Glenaladale, Prince Edward Island, and received his schooling at the Charlottetown Academy. In his twenty-third year he left Prince Edward Island and removed to Montreal, where he engaged in business and eventually amassed a large fortune. One of his largest donations—$5,400,000—was to McGill University, and the endowment for Macdonald Agricultural College, at Sainte Anne de Bellevue, Que., amounted to $5,000,000. He endowed the schools for manual training and domestic science in connection with Ontario Agricultural College, and also gave largely to the Victoria Hospital at Montreal, and to other charitable institutions. The honor of knighthood was conferred on him in 1898.

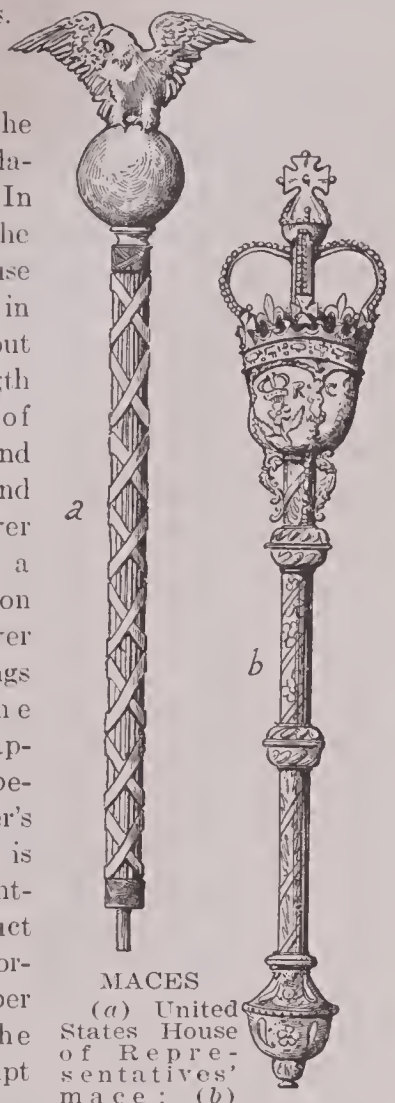
McDOUGALL, *mak doo'gal,* William (1822-1905), a Canadian statesman and journalist, prominent in the movement for Confederation, a member of the first Dominion Cabinet, and the first lieutenant-governor of the North West Territories and Rupert's Land. The acquisition of the Northwest by the Dominion government was a hobby of McDougall's, and it was fitting that he should have been chosen in 1869 as its first governor. On his arrival at the boundary of the Territories, on his way to Fort Garry, McDougall was turned back by the half-breeds under Louis Riel, who thus gave the signal for the Red River Rebellion (which see).

William McDougall was born at Toronto, Ont., studied at Victoria College, Cobourg, and was called to the bar in 1847. While still a law student he began to contribute to newspapers, and in the year he began to practice law, also founded a weekly paper, *The Canadian Farmer.* In 1850 he established *The North American,* a semiweekly paper of somewhat radical tendencies. *The North American* was absorbed in 1857 by the Toronto *Daily Globe,* for which McDougall continued to write until 1870. His work as a journalist won him a seat in the Canadian assembly in 1858. He was commissioner of crown lands from 1862 to 1864, then for three years was provincial secretary, and in 1865 and 1866 also served as chairman of a commission to develop Canadian trade with the West Indies and South America. McDougall was present both at the Charlottetown and Quebec conferences, and took a leading part in the discussions. After Confederation Sir John Macdonald chose him to be Minister of Public Works, but after a year sent him to England to negotiate with the Hudson's Bay Company for the purchase of the North West Territories. In 1871 he was one of the commissioners to settle the boundaries of Ontario, and in 1873 went to London on a special mission relating to Canadian fisheries. He continued to sit in the House of Commons until 1882, when he retired from public life.

MACDOWELL, *mak dou'el,* Edward Alexander (1861-1908), an American pianist and composer, whose art is representative of the best music that America has produced. He was born in New York City, and studied in Paris, Wiesbaden and Frankfort. Upon his return to America, in 1888, his compositions as well as his playing, which was always characterized by great poetic feeling, became very popular. His compositions have an atmosphere of the woods, and he had a happy faculty of introducing into them touches of American folk-music, notably Indian. He composed an *Indian Suite* for the orchestra, and the most popular of all his compositions for the piano, *Woodland Sketches,* likewise embraces Indian themes. He published nearly sixty works, which include almost 300 separate compositions. Important among these are the symphonic poems, *Hamlet and Ophelia, Lancelot and Elaine* and *Lamia,* and the sonatas *Norse* and *Keltic.* From 1896 to 1904 he was the head of the department of music at Columbia University; the year following his resignation his mind failed, and he died three years later.

McDOWELL, Irwin (1818-1885), an American soldier who played a prominent but somewhat unfortunate part during the War of Secession. He was born at Columbus, Ohio, received his education in France and at West Point, and during the Mexican War received the brevet rank of captain for gallantry at Buena Vista. Shortly after the outbreak of the War of Secession he was made brigadier general of volunteers in the Federal army and given command of the Army of the Potomac. A serious defeat in the first Battle of Bull Run, though due to no lack of skill on his part, told against him, and McClellan was given his command. Later he took part in the battles of Cedar Mountain, Rappahannock Station and Bull Run, but in September, 1862, was relieved from field duty. A court of inquiry investigated the charges and acquitted him fully.

MACE, a club-shaped staff used as a symbol of authority. It was first known in early Roman days, when lictors bore *fasces,* or staffs, before magistrates. Its use was continued in councils, and it became the emblem of legislative authority. In the United States the mace in the House of Representatives in Washington is about three feet in length and consists of ebony rods bound together with a band of silver. A silver globe stands on a protruding rod, on which rests a silver eagle with wings outspread. If the legislative body appears at times beyond the Speaker's control the mace is lifted by a sergeant-at-arms and the act at once restores order. Any member disregarding the mace is in contempt and liable to censure and expulsion. See the article LICTOR, for illustration of *fasces.*



MACES
(*a*) United States House of Representatives' mace; (*b*) the mace of the English House of Commons.

MACE, a highly-flavored spice obtained from the covering of the nutmeg, which is the seed kernel of a pear-shaped tropical fruit (see NUTMEG). When this fruit becomes ripe its fleshy halves open, exposing the mace-covered kernel. Fresh mace is somewhat fleshy and of a blood-red color, and in fragrance and flavor is similar to the nutmeg. To prepare the mace for the market the natives dry it in the sun, which makes it half transparent and orange-yellow in color. It is used as a flavoring, either whole or ground. Mace is grown chiefly in the Spice Islands (East Indies) and in the West Indies.

MACEDONIA, *mas e do' ni a,* or **MACEDON,** once the mightiest empire in the world, now only an unimportant division of territory in the heart of the Balkan Peninsula. For many years its people suffered cruelly at the hands of the Turks, but it was finally liberated in the Balkan War and divided between Serbia, Bulgaria and Greece, the last named getting the important seaport of Saloniki. In ancient times Macedonia was the name of the territory lying north of the Aegean Sea and Thessaly, east of Illyria and west of Thrace. The capital was Pella. Whether the Macedonians were of Greek origin is a matter of doubt. They were so different in manner and custom that it is now considered probable they were a distinct people.

Philip of Macedon, or Philip II, made Macedonia a powerful state soon after his accession in 359 B.C. Under Alexander the Great, the illustrious son of Philip, Macedonia reached its highest glory and spread until the empire embraced the countries now known as Greece, Turkey, Persia and Egypt. After the death of Alexander, the empire was divided among his generals.

Modern Macedonia, north of the Grecian frontier and south of Bulgaria, since the middle of the nineteenth century has been the scene of bitter rivalry between the mixed races of inhabitants. The great "Eastern Question" which has so long perplexed the powers of Europe in reality was a question of Macedonian existence. Among the inhabitants are Christians, Jews and Mohammedans of all nationalities, with the Turks, the ruling race, in the minority. The inhabitants frequently rose against the Turks, who put down these insurrections with the utmost cruelty, and occasionally indulged in unprovoked wholesale slaughter of Christians. Repeated representations by the powers failed to bring about any permanent improvement in condition.

In 1903 Russia and Austria demanded reforms in the administration of Macedonia, and Turkey apparently yielded. Nothing definite being done, the Macedonians rose in revolt and war was waged for some months, when they were persuaded to lay down their arms upon promises from Turkey of better government. For several years the situation remained without improvement; occasional outbreaks were suppressed, and unprovoked massacres and intolerable persecution of Christians marked Turkish rule. In 1912 the Balkan states declared war against Turkey. As a result of the war Macedonia was divided between the Balkan allies. W.E.L.

Related Subjects. The following articles in these volumes will be of interest:

Alexander the Great	Philip II (Macedon)
Balkan Wars	Saloniki
Greece, subtitle *History*	Turkey

McGEE, *ma gee',* THOMAS D'ARCY (1825-1868), a Canadian poet, orator, journalist and statesman, one of the most brilliant of the group of leaders who shaped the course of events in the years immediately preceding Confederation. McGee was most effective in protest. He held office several times, but in his career the offices were subordinated to the principles for which he stood. He was not the type of man who could sit quietly in an office and perform routine duties. He was a born reformer, a fiery orator who was constantly stimulated to speech by more or less revolutionary doctrines. His speeches advocating Confederation were perhaps the strongest emotional appeals in support of that movement, and the very last speech of his life was a plea for mutual kindness and good will to cement the lately-formed union of the provinces.

THOMAS McGEE

McGee was born in Ireland, and to his death was an ardent lover of his native country. At seventeen he emigrated to Boston, Mass., where he speedily won fame by a Fourth of July oration, delivered, so one commentator says, "in such a transporting way that the multitude became entirely enchained." Even with due allowance for exaggeration, this is remarkable praise for a boy of seventeen. Some days later he was given a position on the Boston *Pilot,* and when he left it, at the age of twenty, he was editor-in-chief. In the *Pilot* appeared many of the poems which gave him a wide reputation. In 1845 he returned to Ireland, largely through the influence of Daniel O'Connell, who enlisted his literary ability in the struggle to free the Roman Catholics from political disabilities. After a year or two McGee became identified with the "Young Ireland" movement, but the danger of arrest led him to leave Ireland in 1848 and return to America.

For two years McGee then edited the New York *Nation,* in which he expressed himself so vigorously at the action of the clergy in dissuading the Irish from rebellion that the Roman Catholic archbishop of New York secured the suppression of the paper. McGee then edited a newspaper in Boston for several years, his views meanwhile becoming less revolutionary. In 1857 he moved again, this time to Montreal. There he established a journal called *The New Era,* made a reputation as an orator, and almost at once obtained a seat in the Canadian assembly. He was president of the council in 1862, and minister of agriculture in 1864, and in 1867 was elected to the Dominion House of Commons. He strongly denounced the Fenians, but his mature judgment was bitterly criticized by some of those who had supported the schemes of his youth. One of these men shot him dead after he had delivered a brilliant speech, already mentioned above, on the subject of cementing the union of the provinces.

In addition to numerous poems and articles on political topics, McGee wrote a *History of the Irish Settlers in America,* which is still a standard book; *History of Attempts to Establish the Protestant Reformation in Ireland;* and *Popular History of Ireland.* G.H.L.

McGILL, *ma gil',* **COLLEGE AND UNIVERSITY,** an institution of higher learning situated in Montreal, Canada. It was founded by the will of Hon. James McGill, a Canadian fur-trader and statesman, and received a charter in 1821. The school when first opened, in 1829, had two faculties, arts and medicine. Since then, departments of law, applied science, engineering and agriculture, the graduate school and departments of music and dentistry have been added. A course in military instruction is given which prepares for commissions in the imperial army or the Canadian Permanent Corps. Graduates from the engineering courses readily find government employment. Students attend McGill from every part of the British Empire. For the convenience of prospective English students, entrance examinations are held each spring in London.

Women are admitted only to the arts courses at McGill, but courses in arts and science, given by professors and lecturers of the university, may be pursued by them at the Royal Victoria College for Women, established in 1899 in the same city. Macdonald College of Sainte Anne de Bellevue, Quebec, with its Agricultural School, Teachers' Training School and School of Domestic Science; McGill University Colleges of British Columbia, Vancouver, B. C., and Victoria, B. C., are known as incorporated colleges affiliated with McGill. Mount Allison University at Sackville, New Brunswick, and Acadia University at Wolfville, Nova Sco-

tia, are universities in close relationship with McGill, especially in the faculty of engineering.

McGill College and University is nominally under the control of the Crown, but is really a private, endowed institution. The endowment exceeds $3,000,000 and there are 144,000 volumes in the library. The student enrolment is over 2,100, and the faculty numbers about 180. Thousands of its alumni and undergraduates served their country in the great War of the Nations.

McGILLIVRAY, *ma gil' i vri,* ALEXANDER (about 1740-1793), a chief of the Creek Indians, who took an active part against the colonists in the Revolutionary War (see CREEKS). McGillivray was the son of a Scotch trader and a half-breed Indian woman of royal stock, and was educated in Charleston, S. C. After his return to the Creek country, now Alabama, he acquired wealth by trading, and on the death of his mother succeeded to the leadership of the tribe, assuming the title "emperor of the Creeks." On the outbreak of the Revolutionary War his estates were appropriated by Georgia and he and his warriors joined forces with the British. Until 1790 he was a prominent instigator in the border hostilities, but visited New York in that year and made a treaty of peace in behalf of his tribe. He also resigned his commission as colonel in the Spanish service for the commission of major-general in the service of the United States, but continued to rule as chief of the Creeks until his death.

MACHAR, *ma kahr',* AGNES MAULE (1856-), also well known under her pen name of FIDELIS, a Canadian poet and writer of short stories, one who is distinguished not merely for excellence in composition but also for a high moral quality. "If there is something to be said for the right, a wrong to be redressed or a warning word uttered, I think we should always be ready with our pen." Much of her literary taste and aspiration comes to her naturally from her father, who was the second principal of Queen's University. From early youth she has been a contributor to periodicals at home and abroad, especially to the *Canadian Magazine,* the *Century Magazine* and the *Westminster Review.* In 1887 she won a prize offered by a Toronto journal for the best poem on the Queen's jubilee. Among her many published works are *For King and Country; Katie Johnson's Cross; Lucy Raymond; Stories of New France; Roland Graeme, Knight; Lays of the True North,* a collection of her poems; and *Stories of the British Empire.*

MACHIAVELLI, *mah kyah vel' le,* NICCOLÒ (1469-1527), an Italian statesman whose name has long been regarded as synonymous with all that is deep, dark and treacherous in statesmanship. This reputation has clung to him because of his remarkable book—*The Prince.* In this he argued that Italy could become a united nation only through the leadership of a despotic prince who would use any means, no matter how wicked, to create a new state. Machiavelli was a native of Florence and lived in troublous times, during the exile of the Medici family and the republican influence of Savonarola. For fourteen years he held the position of first secretary of the council of the Florentine republic, and proved himself an efficient officer but never a leader of men. He was sent on many missions, during one of which he was closely associated with the unscrupulous Cesare Borgia, who infatuated him and whom he idealized as a perfect prince and hero. In 1512 the Medici returned to power, and Machiavelli was deprived of his office. He retired from political life and devoted himself to literature. His best-known works are a *History of Florence, The Art of War, Discourses Upon the Ten First Books of Livy,* several comedies and, most famous of all, *The Prince.* He may be regarded as the founder of that school of politics which recognizes no moral law and separates ethics and politics.

MACHINE, *ma sheen'.* A machine is any device that will perform work. The hammer whose claw will pull a nail from a board is a machine. The pulley is as truly a machine as is the locomotive; the difference lies in the amount of work each can perform, in their comparative complexity, and in the manner in which their work is performed.

The age in which we live is often described as the age of the machine, and for the best of reasons. The coming of machines to supplant hand labor separated the old-world order from the new and gave a demonstration of the truth that "time maketh ancient good uncouth." The changes it wrought were profound and far-reaching—they penetrated every department of life. Indeed, it is probably no exaggeration to say that the life of the average man of to-day differs more from that of a Frenchman living in the reign of the great Louis XIV than the latter's life differed from that of a Roman citizen under the Caesars. Machines, naturally, did not bring about all these changes, but their influence was very great.

The Greek and the Roman patricians indulged in a lavish display and a liberal scale of living, but they could hardly have imagined the wealth of the modern world. Compared with London and New York, the cities of the classic world were poor, and the cities of the medieval world were poverty-stricken. The great wealth of the present world is due largely to machines.

Changes in Production. Before the machine was invented, man had what he could make with his hands. He was often a cunning craftsman who loved and wrought beautiful articles, but the rate of production was necessarily slow. Surplus wealth did not accumulate. The change in man's material condition dates from 1769, the year in which James Watt invented the steam engine. The steam engine was only the first of a series of inventions, which included the cotton gin, power looms for weaving, and steam locomotion on land and sea. Invention has gone steadily on in every department of life for a century and a half; it has changed the social habits of all civilized peoples, and has completely revolutionized industry.

It has been estimated that the power used in machinery produces twelve times as much as all human labor could produce without it. The natural result has been an enormous increase in production, with a consequent cheapening of the articles produced. Invention has followed invention. The thirteenth annual report of the United States Department of Labor on hand and machine labor listed 672 examples of labor-saving machinery. Only a few of the more important machines can be referred to here.

The results obtained with the cotton gin are among the most striking. It was invented by Eli Whitney in 1793. By the old hand method, a worker would have spent about two years in turning out a bale of cotton. The machine produces from three to fifteen bales a day. Improved methods resulted in a fall in price of about thirty cents a pound in a little over a century. The introduction of the power loom revolutionized the industrial life of England. Cotton spinning ceased to be a cottage industry and was carried on in factories by hired labor. The old spindle and distaff gave way before the spindle of the modern machine, which can be run at a speed of 11,000 revolutions a minute. Steam was first successfully applied to navigation early in the last century. In a hundred years the improvements have been amazing. Instead of Fulton's *Clermont,* we have the *Imperator,* driven through the water at thirty miles an hour, by Parson's turbine engines rated at 68,000 horse power. Delicate but powerful electrical machines have recently become a serious rival of steam power.

By no means the least wonderful of the machines perfected in the last century are those used in printing. The linotype can be made to do the work of about five printers, nor is its mechanism less remarkable than its speed. The huge presses on which the metropolitan papers are printed are capable of turning out 96,000 copies of a sixteen-page paper an hour, counted and folded.

Effect on Labor. Labor-saving machinery has often been bitterly assailed by the workers whom it has displaced. In England during the transition period, the weavers, reduced to abject poverty, forced to leave their homes in the country and become wageworkers in crowded towns, revolted and smashed the machines. Hundreds became public charges. In general, however, it is believed that the workers as a whole do not suffer through the introduction of new machines, though it is not denied that certain groups of workers may be subjected to great temporary hardships during periods of adjustment to new conditions. At present the hopes of the workers may be said to be fixed on obtaining a more equitable distribution of the increased riches brought by the machine. See INVENTION. E.D.F.

Related Subjects. The following list of articles in these volumes contains not only machines and certain important devices connected with machines, but instruments as well:

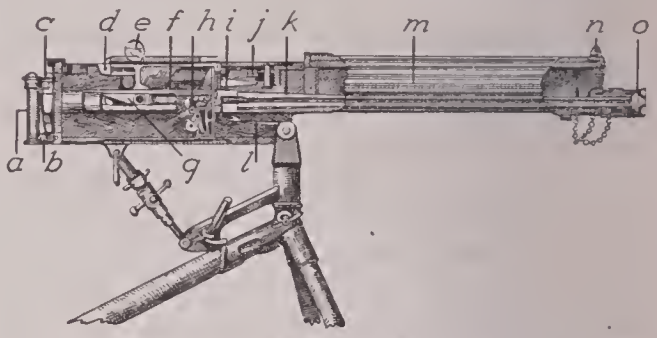
Adding Machine
Air Brake
Air Compressor
Air Engine
Air Pump
Archimedean Screw
Balance
Barker's Mill
Barometer
Bell
Bellows
Belt
Block and Tackle
Blowing Machines
Blowpipe
Boiler
Boring Machines
Calculating Machines
Cam
Camera
Camera Lucida
Camera Obscura
Carburetor
Cash Register
Chronometer
Clock
Compass
Cotton Gin
Crane
Diagonal Scale
Dictograph
Die
Dipping Needle
Dynamo
Electric Bell
Electric Machine
Electric Motor
Engine
Field Glass
Filter
Flying Machine
Galvanometer
Gas Engine
Gauge
Governor
Gyroscope
Hectograph
Heliograph

Hydraulic Engine
Hydraulic Ram
Hygrometer
Injector
Kinetograph
Knitting Machine
Lathe
Lens
Level
Lightning Rod, subtitle under Lightning
Linotype
Lock
Magneto-Electric Machine
Micrometer
Microscope
Mimeograph
Monotype
Mowing Machine
Multigraph
Numbering Machine
Opera Glass
Ophthalmoscope
Pedometer
Periscope
Planing Machine
Plummet
Polariscope
Printing Press
Pulmotor
Pump
Quadrant
Radiometer
Rain Gauge
Ratchet
Reaping Machine
Safety Valve
Screw
Seismograph
Sewing Machine
Sextant
Slide Rule
Slot Machine
Snowplow
Solar Engine
Solar Microscope
Spectroscope
Speedometer
Spinning Jenny
Spinning Wheel
Spirometer
Steam Engine
Steam Hammer
Steam Shovel
Stereopticon
Stereoscope
Stethoscope
Talking Machine
Telautograph
Telegraph
Telephone
Telescope
Theodolite
Thermograph
Transit Instrument
Trip Hammer
Turbine Wheel
Typewriter
Valve
Vise
Voltmeter
Watch
Water Wheel
Wedge
Weighing Scale
Wheel and Axle
Windlass
Windmill

MACHINE GUN, a military weapon specially designed to maintain a rapid fire, delivering sometimes as many as 450 bullets per minute. The War of the Nations, which convulsed Europe in 1914, was largely a struggle of heavy artillery and machine guns instead of light artillery and rifle fire, as in previous wars. Machine guns assumed such importance and were so effective that rifles became of secondary importance, valuable chiefly in impetuous charges on the enemy's lines, and even then the final rush of the attacking force towards the enemy's trenches, preceded always by big gun bombardment, was supported by machine-gun fire. In the hand-to-hand conflict that ensued the soldiers relied largely on the bayonet.

The modern machine gun is not the result of one invention, but of a series of inventions and improvements. As now employed in war, the object of the machine gun is to concentrate the power and deadliness of a great number of rifles in one particular place. One machine gun delivering 300 shots per minute upon a bridge over which hostile troops were attempting to cross would be equal in effect to sixty rifles in the hands of expert sharpshooters. A concentration of machine-gun fire is more deadly than shrapnel, and more dreaded than the fiercest bayonet charge.

The Maxim. The accompanying illustration shows the various parts of the most approved machine gun of the present day. This gun,

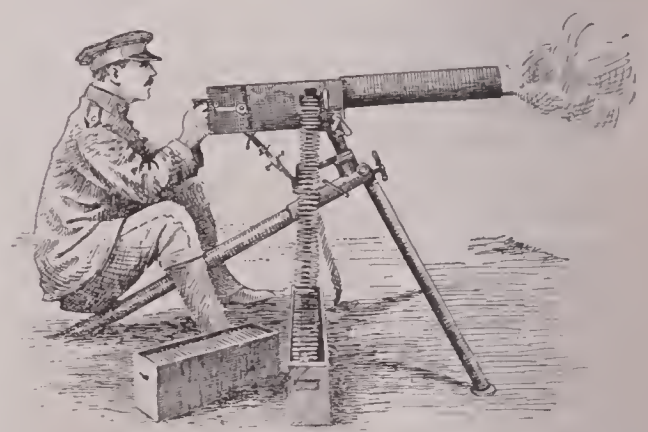


PARTS OF A MAXIM MACHINE GUN

(*a*) Handle block
(*b*) Firing trigger
(*c*) Safety catch to prevent accidents
(*d*) Sight rack
(*e*) Rear sight
(*f*) Recoil plate
(*g*) Crank
(*h*) Firing pin
(*i*) Carrier
(*j*) Feed box
(*k*) Barrel
(*l*) Ejector tube spring
(*m*) Water jacket for cooling barrel
(*n*) Front sight
(*o*) Nozzle

named after Sir Hiram Maxim, its inventor, was the first machine gun which automatically performed the operations of loading, firing and removing the empty cartridges. It was adopted by the British army in 1889, and so perfect did it prove that few improvements have been found necessary. Maxim first offered his invention to the United States military authorities but they received him without enthusiasm. He then took it to Europe, where it was very eagerly accepted. It has since been adopted with certain modifications by nearly all European armies.

The barrel is surrounded by an outer tube or jacket filled with water, to prevent overheat-



GUN IN OPERATION

ing. The cartridges are supplied from a belt which passes over a feed wheel behind the breech. It is claimed that the full capacity of

the Maxim is 750 shots per minute, but under war conditions 300 per minute is a good average. The gun is mounted on a tripod, the rear leg of which supports a seat for the operator. The latest pattern Maxim gun used by the British weighs thirty-six pounds, and is easily transported from place to place. For use with mounted troops the German army is supplied with a Maxim weighing sixty-one pounds, which is mounted on a carriage weighing 110 pounds. The German infantry are provided with machine guns which weigh thirty-eight pounds, with a carriage of seventy-five pounds weight. Maxims and all other machine guns are built to fire cartridges similar to those used in the rifles of the army to which they are attached.

The Hotchkiss. The Hotchkiss gun, named from its inventor, Benjamin Berkley Hotchkiss (1826-1885), uses the gas formed by the powder to operate the mechanism. The gas escapes through a small hole in the barrel to a tube underneath, and pushes back a piston which operates the mechanism. This gun was in general use in the armies of the leading nations until replaced by more recent inventions.

Other Machine Guns. Practically every machine gun now in use is a modification of the original invention of Maxim. The Benet-Mercie gun, in use in the United States army, has no water jacket for cooling purposes. It has a barrel of about an inch in thickness and can be fired continuously for some minutes before becoming too hot to operate. Its capacity may be as high as 400 shots per minute, but under average conditions it shoots only about 250 times a minute. The gun weighs twenty-seven pounds and the tripod weighs fifty pounds. In 1915 the United States army began experimenting with the Vickers machine gun, a water-cooled implement, with a jacket similar to the Maxim. Its rate of firing is about the same as the Benet-Mercie, and in tests it has fired 6,000 shots without stopping.

The Hotchkiss gun, referred to above, is very highly favored by the French military authorities. It is one of the most efficient of all guns for use in military aeroplanes. The French term *mitrailleuse* refers technically to an old-style, rapid-firing gun used in the Franco-German War in 1870, and it is still applied to machine guns of all patterns in France.

The various kinds of machine guns have an effective range varying from one-third to seven-eighths of a mile. L.R.G.

Consult *Handbooks of Automatic Machine Rifle and Maxim Automatic Machine Gun*, published by the War Department of the United States.

MACKAY, *ma kay'*, JOHN WILLIAM (1831-1902), a man who began his career as a poor boy in New York, but during his life amassed a great fortune, the result of a strong character and perseverance. He emigrated to America from Dublin, Ireland, and settled with his parents in New York, where his father soon died. When the rush to the California gold fields began, Mackay was learning the trade of shipbuilding, but with others he left for the West, where he learned thoroughly the business of mining and was ready for his great opportunity when it came. He was one of the discoverers of the famous "Bonanza" mines of Nevada. With five other men he gained control of these mines, Mackay having twice as much stock as all the others. From one mine alone $150,000,000 in gold and silver was taken out. Mackay also became a partner of the firm which owned the Bank of Nevada. In 1884, in company with James Gordon Bennett, he organized the Commercial Cable Company and the Postal Telegraph Company, and was successful in a fight with the old cable lines, which sought, by reducing their rates, to force him out of business. The cable company succeeded in laying two lines across the Atlantic. One of Mackay's many public gifts is the Roman Catholic Orphan Asylum at Virginia City, Nev. His son, Clarence H. Mackay, succeeded to his business interests.

McKEES'PORT, PA., a city of Allegheny County, fourteen miles southeast of Pittsburgh, in the heart of the bituminous coal and natural gas fields of the state. It is situated on the Monongahela River, at the mouth of the Youghiogheny, and on the Baltimore & Ohio, the New York Central, the Pennsylvania and the Pittsburgh & Lake Erie railroads. The rivers are crossed at this point by eight bridges. Electric lines extend to Pittsburgh and to other cities and towns in the Monongahela Valley. Population in 1910, 42,694; in 1916, 47,521 (Federal estimate). The area is nearly four square miles.

McKeesport is the center of a vast iron and steel industry. It has been called the "Tube City," because of its largest concern, one of the greatest tube works in the world, employing nearly 8,000 men. Among the principal manufactures are sheet and tin plate, tool steel, projectiles, glass, coke and coal-tar products. There is an important trade in locally-

manufactured goods, coal and lumber. The more prominent public buildings are the Federal building, city hall, Carnegie Library, Masonic Temple, Y. M. C. A. building and the city hospital.

McKeesport was founded in 1795, and was named in honor of the first settler, a Scotchman who operated a ferry across the rivers. The place was unimportant until 1830, when the coal fields were opened. It was incorporated as a borough in 1842 and became a city in 1891. The commission form of government was adopted in 1913. MC L.L.

McKEES ROCKS, PA., a borough in Allegheny County, adjoining Pittsburgh and situated opposite Allegheny on the Ohio River. It is on the Pittsburgh & Lake Erie and the Pittsburgh, Chartiers & Youghiogheny railroads. The population in 1910 was 14,702; in 1916 it was 19,949 (Federal estimate). The area of the borough exceeds one square mile. Its leading industrial establishments are iron and steel works, railroad machine shops, and manufactories of lumber, wall plaster, concrete, freight and passenger cars. There is a Federal building, and the borough has the Ohio Valley General Hospital.

MACKENZIE, *ma ken' zi,* the name borne by a former district of Canada, which constituted the nucleus of the present North West Territories. It lay far to the north, touching the Arctic seas, and only Yukon was farther to the west; on the east was the district of Keewatin, and on the south Athabaska and British Columbia. It had an area of 563,200 square miles, but so inaccessible was it and so rigorous its climate that its population remained very small. In 1901 it had but 5,216 inhabitants, most of them in settlements along the Mackenzie, the chief river of the district.

In 1912 Mackenzie was combined with Franklin and with the northern part of Keewatin to form the North West Territories. F.O.

MACKENZIE, ALEXANDER (1822-1892), a Canadian statesman, the first Liberal Premier of the Dominion, a man whose integrity has become proverbial. In an age when corruption was common and too often excused, no breath of suspicion ever attached to Alexander Mackenzie. "While perhaps too cautious to be the ideal leader of a young and vigorous community, his grasp of detail, indefatigable industry and unbending integrity won him the respect even of his political opponents." Aside from his honesty, Mackenzie's most prominent characteristic was his opposition to class distinctions of any kind, a democratic attitude which made him three times decline the honor of knighthood.

Alexander Mackenzie was born near Dunkeld, Perthshire, Scotland, on January 28, 1822. As a boy he spent several winters in school, but at thirteen he began to work, learning the trade of a stonemason. His father died in 1836, leaving seven sons, all of whom afterwards settled in Canada. Alexander emigrated in 1842, and settled at Kingston, Ont., where he worked as a stonecutter and afterwards became a building contractor. In 1847 he removed to Sarnia, Ont., where he continued to prosper to such an extent that about 1852 he began to give a part of his time to other interests. In that year he became editor of the Lambton *Shield,* a Liberal organ through which he expressed his personal desire for an expansion of popular political rights as well as his party's principles in general.

ALEXANDER MACKENZIE

After 1852 Mackenzie gave himself wholly to public affairs. In 1861 he was elected to the Canadian assembly, in which his wide range of knowledge and his readiness in debate gave him a powerful influence. He strongly advocated Confederation, and in 1865 declined a place in the coalition Ministry which was formed after the resignation of George Brown. Mackenzie was at first one of Brown's chief lieutenants, but after 1867 was the recognized leader of the Liberals in Parliament. He was elected to the first House of Commons in 1867, and from December, 1871, to October, 1872, also sat in the Ontario provincial assembly and was provincial treasurer in the cabinet of Edward Blake. Dual representation, which allowed a man to represent his constituents both in the provincial and the Dominion legislative bodies, was abolished in 1872, and Mackenzie thereafter devoted himself to national politics.

First Liberal Premier. On the resignation of Sir John Macdonald in 1873, as a result of the Pacific railway scandal, Mackenzie was called on to form a Ministry. Of the many important changes made by the new government, espe-

cially noteworthy were the introduction of the Australian ballot (1874), the establishment of the Dominion Supreme Court (1875) and the organization of a government for the North West Territories. Mackenzie was also instrumental in securing changes in the Governor-General's instructions from the British government, so that he is now practically bound to accept the recommendations of the Dominion Cabinet. Mackenzie's five years in office were marked by efficiency and economy in government, and by industrial depression throughout the country. This depression, combined with the Conservative demand for a protective tariff, defeated the Liberals in the general elections of 1878. For two years thereafter Mackenzie led the Liberals in opposition, but in 1880 ill health led to his retirement from active leadership, although his constituents kept him in the House of Commons until his death, April 17, 1892, at Toronto. G.H.L.

Consult Buckingham and Ross's *Life and Times of Alexander Mackenzie.*

MACKENZIE, Sir Alexander (1755-1820), a Canadian explorer and fur trader, discoverer of the Mackenzie River and the first white man to reach the Pacific coast of Canada from the interior. Mackenzie was born in Scotland, at Inverness, but emigrated to Canada in 1779. Soon after the organization of the Northwest Company to oppose the Hudson's Bay Company's monopoly, he entered its service, and in 1784 was sent to Detroit with a small party of traders. The traders already established in that section stirred up the Indians against him, and it was only after a long struggle, during which one of his companions was murdered and several were wounded, that the intruders were permitted, in 1787, to share in the trade.

Two years later, in June, 1789, Mackenzie set out on the first of the exploring trips which made him famous. Leaving Fort Chipewyan with a small party of Canadians and Indian guides, he traversed the region about Great Slave Lake, and discovered a great river, now called the Mackenzie, which he traced to its mouth in the Arctic Ocean. After setting up a post on the shore as evidence of his discovery, Mackenzie returned southward, reaching Fort Chipewyan just 102 days after his departure. Three years later he made a second trip, on which he ascended the Peace River, crossed the Rocky Mountains, and finally reached the Pacific Ocean on July 22, 1793. The very next day a band of Indians treacherously attacked him, and all but murdered him. Thereafter Mackenzie devoted his energies to the fur trade, and amassed a considerable fortune. In 1801 the honor of knighthood was conferred upon him, and in 1802 he organized a trading company (Alexander Mackenzie & Co.), which threatened serious competition in the fur trade for two years, when it was absorbed by the Northwest Company. Mackenzie's later years were spent in Scotland, where he died. His narrative of his travels, entitled *Voyages on the River Saint Lawrence and through the Continent of North America to the Frozen and Pacific Oceans in the Years 1789 and 1793,* is a valuable document in the study of Canadian history.

MACKENZIE, Arthur Stanley (1865-), a Canadian educator and scientist, one of the foremost contemporary physicists, and president of Dalhousie University since 1911. Dr. Mackenzie was born at Pictou, N. S., attended the public schools of Pictou, New Glasgow and Halifax, and finally was graduated with honors from Dalhousie University in 1885. The two years immediately following his graduation were spent as assistant master at Yarmouth (N. S.) Academy. He was from 1887 to 1889 tutor in mathematics in Dalhousie University, then spent two years in advanced study at Johns Hopkins University, and from 1891 to 1905 taught physics at Bryn Mawr College. Since then, with the exception of the year 1910-1911, during which he was professor of physics at Stevens Institute of Technology, he has been at Dalhousie University, at first as professor of physics, and since 1911 as president. Dr. Mackenzie is the author of *Laws of Gravitation* and of many scientific pamphlets and papers. Dr. Mackenzie is one of the most conspicuous examples, perhaps the most conspicuous in Canada, of that rare combination, a scientist who has the gift of being able to teach.

MACKENZIE, Sir William (1849-), a Canadian railroad builder, whose ability as a financier, added to the engineering skill and organizing capacity of Sir Donald Mann, is responsible for the construction and successful operation of the Canadian Northern Railway. Mackenzie was born at Kirkfield, Ont. He received a public school education, as a young man taught school, and later entered the lumber business. His first contact with railroad work was as contractor for the Midland division of the Grand Trunk Railway. Later he built a part of the Rocky Mountains section of the Canadian Pacific Railway, and since 1886, in partnership with Sir Donald Mann, has been

responsible for the construction of thousands of miles of line in Canada and other countries. The first railway built and also owned by Mackenzie, Mann & Co. was the Lake Manitoba Railway & Canal Company's line, 100 miles long, completed in 1896. Out of this small beginning has grown the great Canadian Northern system, comprising over 8,000 miles of railway. Sir William is president of the Canadian Northern and of many subsidiary railways, street railways and other public service corporations. He also controls transportation lines in Cuba, Mexico and Brazil. In 1913, when the Canadian Northern Railway was in dire financial straits, Sir William was instrumental, if not chiefly responsible, in obtaining assistance from the Dominion government. The honor of knighthood was conferred on him in 1911.

MACKENZIE, WILLIAM LYON (1795-1861), a Canadian reformer and statesman, leader of the Rebellion of 1837 in Upper Canada and for a generation conspicuous in every movement for radical political changes. Mackenzie was a strange mixture of the pathetic, the ludicrous and the heroic. He was a born agitator, and like every man who is constantly laboring on behalf of a propaganda, he tended to exaggeration and, occasionally, to misrepresentation. On the other hand, he was a man of unquestioned integrity and of great moral courage, a man who could not be bribed, bullied or cajoled. He was lacking, perhaps, in a sense of proportion, so that trivial matters sometimes roused him to a degree worthy of a great cause. Yet on the whole he is one of the noteworthy characters of his time, and without his efforts the progress of Canadians towards political freedom would have been long delayed.

WILLIAM LYON MACKENZIE

Mackenzie was born near Dundee, Scotland, on March 12, 1795. The death of his father less than a month later left the family in poverty, a condition against which he had to fight all his life. He had practically no schooling, and as a young boy earned his own living. He emigrated to Canada with his mother in 1820, settling first at York (Toronto), later Dundas, and finally Queenston, where he became a storekeeper. The general dissatisfaction with political conditions in Upper Canada led him to take an interest in public questions, and in 1824 he began to publish a newspaper, called the *Colonial Advocate,* in which he expressed bitter criticism of the government. Shortly afterward he removed to York, the capital of Upper Canada, where he continued to issue his paper. To punish him for his steady attacks on the government a mob wrecked his printing office, but Mackenzie brought suit against the leading rioters and was awarded $2,500 damages, a windfall which enabled him to continue his publication with greater energy than ever before. Most of the reforms he advocated have since been adopted, but the bitterness of his attacks roused great opposition among the Tories, headed by Sir John Beverly Robinson.

His Political Career. In 1828 Mackenzie was elected to the assembly. He was reëlected two years later, but was denied this seat on the ground that he had published an account of parliamentary proceedings without a license to do so. This libel, as it was called, was an obvious pretext, the real reason being his extreme radicalism. Four times more he was elected, and four times was refused admission. Finally the government refused to issue new writs of election, and York for several years was without its proper representation in the assembly. In 1832 Mackenzie went to England to advocate certain reforms in the Canadian government, and also to secure the removal of certain officials, a mission in which he was successful. In 1834, shortly after his return to Canada, Toronto, as York was now called, elected him its first mayor, and at the expiration of his term elected him to the assembly, to which he was then regularly admitted.

For a year or two the Reformers were in the majority in the assembly, but in 1836 Mackenzie and all the other leaders of his party were defeated for reëlection. The result of this defeat was to drive Mackenzie along the same path taken by Papineau (see PAPINEAU, LOUIS J.), with whom the Upper Canada Liberals had been in consultation for a year. Mackenzie now began openly to applaud the people of Lower Canada, who were planning insurrection, and advocated a republican form of government. From such talk to open rebellion was a short step, and on November 25, 1837, Mackenzie proclaimed a provisional government. He gathered between 700 and 800 men to seize Toronto, but a series of delays gave the governor, Sir Francis Bond Head, time to prepare a defense. In an engagement at Montgomery's

Farm, on December 7, the Reformers were routed, and Mackenzie himself fled to the United States. He established his headquarters on an island in the Niagara River. There for several months he proceeded to annoy both the Canadian and the American governments, until he was finally arrested on a charge of violating the neutrality of the United States and was sentenced to serve eighteen months in prison at Rochester, N. Y. He actually served eleven months, an experience, in the words of a canny biographer, which "cured him of his love for republican institutions."

After his pardon in 1840 Mackenzie worked in the New York customhouse and later for the New York *Tribune*. In 1849 the Canadian government proclaimed a general amnesty to all who had taken part in the rebellion. Mackenzie thereupon returned to Toronto, and from 1851 to 1858 again served in the assembly. Towards the close of this period, the disease of which he died, softening of the brain, had already begun to show its effects and finally compelled his retirement from public life. He died at Toronto on August 29, 1861. G.H.L.

Consult Lindsey's *Life and Times of William Lyon Mackenzie;* Dent's *Story of the Upper Canada Rebellion.*

MACKENZIE RIVER, the greatest river wholly in Canada, and except the Mississippi, the greatest in North America. Its length, 2,525 miles, is nearly as great as that of the Missouri River, and its volume is considerably

COURSE OF THE MACKENZIE

larger. Its average minimum discharge is approximately 500,000 cubic feet per second. This means that in a single day the water discharged by the river would make a lake two miles long, one mile wide and a thousand feet deep throughout. In flood season this amount is increased many times. The average width of the Mackenzie is about a mile, and it has a fall of approximately six inches to the mile. The basin of the Mackenzie River system, including the Peace River, has an area of 682,000 square miles, or nearly one-fifth of the area of the whole Dominion of Canada. The river takes its name from Sir Alexander Mackenzie, the first man to descend its course to the mouth.

Details of Its Course. The head stream of the Mackenzie River system is the Finlay, which rises in the Rocky Mountain Trench, in the north-central part of British Columbia. After a southeasterly course of 250 miles the Finlay meets the Parsnip, and the combined stream, called the Peace River (which see), cuts its way eastward through the Rocky Mountains and then flows northward and eastward through one of the most fertile sections of Canada until it empties into the Slave River. The Slave River is the outlet of Athabaska Lake, into which flows the Athabaska River, which is sometimes regarded as the southern head stream of the Mackenzie system. The Slave River, after a northerly course of 265 miles, flows into Great Slave Lake, from whose western end it emerges as the Mackenzie River. The Mackenzie River proper, from Great Slave Lake to the Arctic Ocean, is over 1,000 miles long, about the distance from Chicago to Quebec.

Like the Yukon, the Mackenzie system is navigable for nearly the whole of its length. The Mackenzie proper is navigable throughout its length usually from the middle of June until nearly the end of October. The same is true of the Slave River. The Athabaska River is navigable as far as the Grand Rapids near Fort McMurray, and is then navigable above the rapids to its outlet from Lesser Slave Lake. The Peace River is navigable for 220 miles above its mouth. The Mackenzie system includes at least 2,000 miles of navigable waterways.

Through its upper course the Mackenzie flows through a rich agricultural and timber district, and farther north there are large deposits of lignite on its banks. For seventy-five or eighty miles above its mouth it flows through a flat delta, parts of which have not yet been surveyed or even explored. Fish are abundant, especially whitefish and trout; the latter often attain tremendous size. Wild game is still

plentiful along the banks, the characteristic animals being the moose, woodland caribou, lynx, marten and porcupine. Farther north the musk ox often appears. Among the birds are the rough-legged hawk, northern shrike, pine grosbeak and white-winged crossbill, all of which keep well to the north; farther south are numerous warblers, the Canada jay, olive-backed thrush, white-throated sparrow and several varieties of woodpeckers.

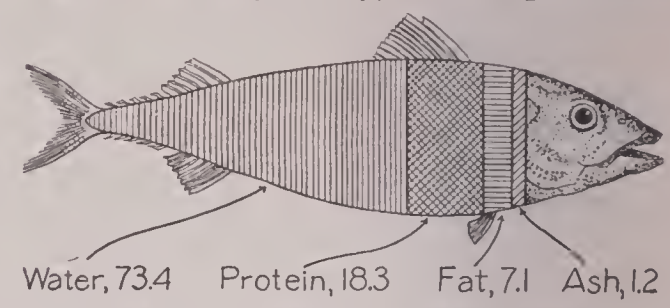
Taken as a whole, the Mackenzie basin is one of the most interesting geographical units of North America. For the present it is still a paradise for the sportsman, or for the man who craves adventure and outdoor life. It includes mountains and plains, forests and barren lands; it has a great variety of animal life, animals which tempt both the trapper and the hunter. Many parts of it, especially the great Peace River Valley, are suitable for agriculture. In short, the Mackenzie basin is the greatest part of the unexploited Canadian Northwest. W.F.Z.

MACKEREL, *mak' er el,* the name of a group of fish found in the open seas of almost all tropical and temperate zones. The *common mackerel* is highly prized for food and easily recognized by its coloring and by its perfect

MACKEREL

proportions. It swims very swiftly, has great power of endurance and seems to be always in motion. In length this fish varies from ten to eighteen inches, and in weight from one-half to three pounds. It is an inhabitant of the North Atlantic Ocean, ranging from Cape Hatteras to the Strait of Belle Isle, between Newfoundland and Labrador, on the American coast, and in European waters from Norway to the Mediterranean and Adriatic seas. This fish is of varying blue and green, with wavy black stripes on top, and of a silvery-white below. When the clouds in the sky have a certain fleecy appearance, formed in zigzag parallel rows, we call them *mackerel* or *mackerel back* clouds, from their resemblance to the markings on the backs of this fish. Two large fins are found on the dorsal side (back) of the mackerel, two smaller ones on the ventral (under) side, and five tiny finlets on both sides just in front of the tail, which is large and forked. The body is covered with small scales, but there are none on the head.

These fish travel near the surface of the sea in schools, sometimes so large as to cover ten square miles, and feed upon other small ocean fish. Their spawning season on both coasts extends from May to July, June being the most



COMPOSITION OF THE MACKEREL

Its fuel value is 645 calories per pound, a little greater than that of the majority of fishes. It averages well with various cuts of veal as a heat producer.

important month. The deeper waters from Long Island to the Gulf of Saint Lawrence are the chief spawning grounds on the American coast. Mackerel are caught in nets, which are floated in the water hanging straight down. As the fish cannot see the nets, the color of which is almost that of the water, they dash head-first into these traps, become entangled in the meshes, and so are made captives. The catch for the United States in average years is about 13,000,000 pounds, valued at nearly a million dollars, and that of Canada over 11,400,000 pounds, with a value approximating $650,000. Gloucester, Mass., is the chief mackerel fishing center in the former country (see FISH, subtitle *Deep-Sea Fisheries*). The average food value of one pound of fresh mackerel as a heat producer is 645 calories, while that of the same quantity of fresh beef loin is 615 calories (see FOOD, subhead *Chemistry of Foods*). G.W.

MACKINAC, ISLAND, *mak' i nak,* or *mak' i naw,* a small island at the northwestern end of Lake Huron, politically a part of Mackinac County, Michigan. It is now a popular summer resort, but was formerly notable as one of the oldest white settlements in the New World. About 1670 Count de Frontenac, governor of New France, caused the island to be settled. At that time it was called *Michilmackinac,* an Algonquin word meaning *place of the big lame person.* Just what was the significance of this word is unknown. The Jesuit missionary, Pere Marquette, established a mis-

sion there in 1671; soon after it became a military post, and Old Fort Mackinac, built in 1712, still stands. In 1761 it was surrendered to

ARCH ROCK

The water of the strait is over 200 feet below the opening, and a delightful view is presented.

the British, but it became American property after the Revolutionary War. During the War of 1812 it was an important military post, was captured again by the British and held successfully against American attacks. It was restored to the United States in 1815.

The city of Mackinac Island, lying under the hills and below the fort, was chartered in 1899. Old Fort Mackinac, formerly a government preserve, was given by the United States government to the state of Michigan and is maintained as a state park. This park covers more than half the island; one of its most picturesque spots is Arch Rock.

McKINLEY, *ma kin' li,* MOUNT, the highest mountain of North America, situated in Alaska, 150 miles north of the head of Cook inlet. It is covered with perpetual snow, and has many glaciers. The actual summit has never been reached by man, but Dr. Frederick A. Cook, of polar exploration notoriety, laid claim to the accomplishment of the feat. He failed, however, to prove his right to the honor. In 1912 two explorers ascended to a height of 20,300 feet; the peak rises only a few feet higher. See COOK, FREDERICK A.

McKINLEY, *ma kin' li,* WILLIAM (1843-1901), an American soldier and statesman, twenty-fifth President of the United States and the third President to lose his life at the hands of an assassin. McKinley's life is still too recent for historians to form a final estimate of his public or private character, but there are certain characteristics which time will not erase from memory. Quiet and dignified in his manner, both among his friends and on the public platform, he was a man to inspire confidence. McKinley was true to the thousands of his friends, and he had the warmest sympathy for men of all classes and all nations. He had a remarkable gift for foreseeing the trend of public opinion, and shaped his course accordingly. For years he held devotedly to his ideal of commercial protection, yet when he saw the United States outgrow it, like a wise man he changed and broadened his ideal. This attitude was not the attitude of a cheap politician; on the contrary, it was a characteristic which enabled McKinley to rise above petty controversies. He was preëminently a man of high principles, of unchallenged integrity.

Ancestry and Youth. McKinley was born on January 29, 1843, at Niles, Ohio. His great-great-grandfather, a Scotch-Irishman, came to America in 1743 and settled in Pennsylvania. James McKinley, the grandfather of the President, moved to Ohio about 1830, and laid the foundations of the family fortune in the iron industry. William McKinley, like his father before him, began to work in the iron foundry when he was still a boy, but he later went to school and finally entered Allegheny College in 1859. He was brilliant in his studies, especially mathematics and languages, but withdrew from college after a year on account of ill health.

Military Career. At the outbreak of the War of Secession McKinley, though only a boy of eighteen, was teaching school. He at once en-

listed in the Twenty-third Ohio Volunteers, of which William S. Rosecrans was first colonel. The regiment served under McClellan in West Virginia in 1861 and in the next year took part in the battles of South Mountain and Antietam. At Antietam McKinley distinguished himself by great gallantry under fire; for this he was recommended for promotion by Colonel Rutherford B. Hayes, who had succeeded Rosecrans as commander of the regiment. On September 23, 1862, McKinley was commissioned second lieutenant, and by the end of the war had risen to the brevet rank of major, the title by which he was commonly known until his election to the governorship of Ohio. He served at various times as aide to General Hancock and General Crook, and was particularly prominent in the battles of Fisher's Hill and Cedar Creek. Cedar Creek was the battle which General Sheridan turned from defeat into victory after his stirring ride from Winchester.

Law and Politics. Major McKinley was mustered out on July 25, 1865, and immediately began the study of law. He was admitted to the Ohio bar in 1867, and established himself in practice at Canton, the county seat of Stark County. This was normally a Democratic district, and McKinley was a Republican, but the voters elected him prosecuting attorney in 1869. In 1872 he made frequent speeches in support of Grant for President, and in 1875 in support of Hayes, who was candidate for governor of Ohio. His vigorous speeches, especially his demand for the resumption of specie payments, made him more than a local figure, and in 1876 he was elected to the House of Representatives. Of this body he was a member until 1891, with the exception of an interval of five months in 1884. In his first term he spoke in behalf of a protective tariff bill, and later voted for the Bland-Allison Act, thus allying himself with the Silver Republicans from the Western states. Steadily reëlected to Congress in spite of every effort to defeat him, McKinley rose in influence, succeeded Garfield in 1880 as a member of the Committee on Ways and Means, and in 1888 became chairman of that committee, a position second only to the Speakership in importance.

During these years Representative McKinley became one of the leaders of the Republican party. He was a regular delegate to its national conventions, twice drafted the tariff plank in the party platform, and in 1888 was one of John Sherman's campaign managers. Reëlected to the House of Representatives for the seventh time in 1888, he framed and carried through Congress the high tariff bill which bears his name (see TARIFF). The McKinley Act became a law on October 6, 1890. One other important measure with which McKinley was connected was the "Sherman Law." In June, 1890, he introduced a bill providing that certificates issued for silver bullion purchased by the government should be legal tender for private debts and also establishing the free coinage of silver at the ratio of 16 to 1 when silver had so risen that 371.25 grains were worth 23.22 grains of gold. The bill passed the House, but was entirely recast in the Senate, and eventually emerged from Congress in the form of the Sherman Law.

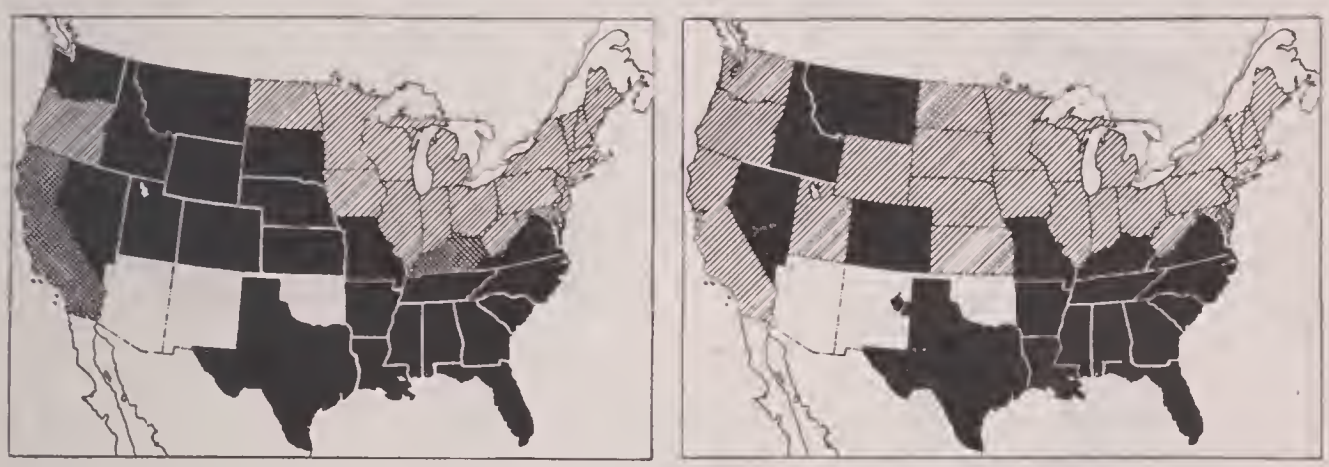
WILLIAM McKINLEY

He defeated William J. Bryan for the Presidency of the United States in 1896, after the most bitterly fought campaign since the War of Secession.

Governor of Ohio and Presidential Candidate. Ohio went Democratic in 1890, and McKinley was defeated for reëlection. In 1891, however, after the close of his service in Congress, he was elected governor of Ohio in an exciting campaign, and in 1893 was reëlected by a plurality of 81,000, one of the largest pluralities ever recorded in the state. During his four years as governor, McKinley worked successfully to improve Ohio's canals, roads, and public institutions. Perhaps his greatest achievement was the establishment of a state board of

arbitration to settle disputes between employers and employees. In general his administration was such as to make him more than ever before a national figure.

At the Republican National Convention at Saint Louis in 1896 McKinley received 661½ votes out of 906 on the first ballot, and thus won the nomination for President. Although he was at one time an advocate of the free coinage of silver, he now quieted the fears of some of his supporters by a vigorous campaign in favor of the gold standard. McKinley received a popular vote of 7,104,779 and an electoral vote of 271, as against 6,502,925 and 176 respectively for Bryan. The campaign was remarkable for the contrast in the methods adopted by the two candidates. Bryan, the Democratic nominee, made a personal canvass of the entire country, whereas McKinley remained at his home at Canton, Ohio. During the course of the campaign, however, the latter delivered about 300 speeches from the porch of his house. This unusual form of campaigning was adopted largely because of the illness of Mrs. McKinley, an invalid. The devotion of McKinley to his wife was one of the finest things in his life. After his election to the Presidency he continued to show the same affectionate regard for her, and whenever she was too ill to leave her room he had his desk moved in, so that he might be near her.



1896 PRESIDENTIAL ELECTION MAPS 1900

The states indicated by shaded lines gave their electoral votes to McKinley; those in solid black were carried by Bryan electors, and the two which are crosslined divided their votes between the two men. The white areas represent nonvoting territories.

The Administration of William McKinley (1897-1901). One of McKinley's first acts as President was to call Congress in extra session to revise the tariff. The result was the Dingley Bill, a strongly protective measure which became a law on July 24, 1897 (see TARIFF). In April the President appointed a commission to investigate international money standards, but nothing came of its investigations. Far more important were the international problems of a political nature which the President then had to face. The annexation of the Hawaiian Islands had long been debated, both in and out of Congress, and was finally effected in 1898. The islands were organized into a territory of the United States on June 14, 1900. About the same time disturbances in Samoa made it advisable to end the joint protectorate which had extended over this group, and in 1900 Tutuila and several smaller islands became the property of the United States.

Spanish-American War. By far the outstanding feature of McKinley's administration, however, is the war with Spain (see SPANISH-AMERICAN WAR). In his inaugural address President McKinley had advocated nonintervention in Cuba, and for a year labored to avert war. Public indignation, however, was aroused by the attitude of the Spanish officials, and the destruction of the battleship *Maine* on February 15. The President at length submitted the questions at issue to Congress, which in April declared unhesitatingly that the Cubans were free and demanded the withdrawal of Spanish troops from the island.

The war which followed was not a great war, measured either by wars which preceded or followed it, but it brought an entirely new set of problems to the President and Congress. The war marks an epoch in the history of the United States. It made the United States a world power in a new sense, for it brought the country into new contact with international politics. At the same time it drew attention to new commercial possibilities, and particularly, by the acquisition of the Philippine Islands, gave the United States a vital interest

1897 ADMINISTRATION 1901 OF McKINLEY

in Asiatic conditions. A renewed demand for a canal across the Isthmus of Panama was still another result of the war (see HAY-PAUNCEFOTE TREATY; PANAMA CANAL). During the remainder of his term the President's efforts were centered on the organization and maintenance of government in Cuba, and on the preparation of the Cubans for self-government. In the Philippine Islands, the native insurrection, which was led by Aguinaldo (which see), was suppressed, and through the efficiency of Judge William H. Taft and the other administrators selected by the President, the greater portion of the new United States possessions were being governed peaceably within a short time after the conclusion of the war.

The Antitrust Movement. The organization of great corporations, aiming to secure monopolies, was one of the most disquieting tendencies in the last decade of the nineteenth century (see TRUSTS). Many large corporations formed at this time were not "trusts" in the accepted sense, but the public looked with suspicion on any large industrial organizations. One evidence of this distrust was a flood of state laws regulating the formation of large corporations and prohibiting the organization of monopolies. This tendency toward the concentration of capital received a decided check as a result of the decision of the Supreme Court in the case of the United States vs. Trans-Missouri Freight Association, a combination of Western railroads.

Other Events. The year 1900 was marked by three events of the first importance. One of these was the Gold Standard Act, making the gold dollar the standard of value in the United States. This act, which became a law on March 14, 1900, gave a legal definition to a condition which already existed. A second event, important for its result rather than in itself, was the Galveston flood. The flood caused great loss of life and property, but out of it arose a political innovation, the commission form of municipal government (see COMMISSION FORM OF GOVERNMENT). A third event was the Boxer Rebellion (which see). The action of the United States in joining the European powers in their demands on China was a further proof that the isolation of the United States was a thing of the past. American warships were sent to Chinese waters, and Americans marched through the sacred "Forbidden City."

Election of 1900. At the Republican National Convention, held at Philadelphia, on June 19, 1900, President McKinley was renominated by acclamation. For Vice-President the convention chose Theodore Roosevelt, of New York. Two weeks later the Democrats nominated Bryan and Adlai E. Stevenson, who had been Vice-President with Cleveland, and declared for free silver and against imperialism. By "imperialism" they meant the policy of colonial expansion. The Republican candidates benefited from the remarkable prosperity which had prevailed in the United States since the previous election, and appealed to the voters with "Four years more of the full dinner-pail," and similar slogans. The election resulted in a sweeping victory for the Republican candidates. McKinley and Roosevelt received 292 electoral votes as against 155 for Bryan and Stevenson. The popular vote was 7,219,530 for the Republicans; 6,358,071 for the Democrats.

McKinley's Second Term. The second term began on March 4, 1901. A few weeks later Aguinaldo was captured, and took the oath of allegiance to the United States, and in June the second Philippine Commission formulated a code of laws for the islands. Military rule then came to an end. Cuba had already adopted a constitution, and in July free trade was established with Porto Rico. The right of Congress to regulate trade between the United States and the newly acquired dependencies was affirmed by the Supreme Court in the so-called "Insular Cases" (1900), which are among the most important constitutional decisions ever made by that body.

The prosperity of the country since his accession to office seems to have worked a change in McKinley's views on the tariff. Through his public career he had stood consistently for a high tariff, but on September 5, 1901, in an address at Buffalo, N. Y., he expressed the hope that "by sensible trade relations which will not interrupt our home production, we shall extend the outlets for our increasing surplus. . . . The period of exclusiveness is past."

The President was in Buffalo for the purpose of visiting the Pan-American Exposition. On the sixth of September, the day following this address, he held a public reception at the exposition in the Temple of Music. Hundreds of people were in line to shake hands with the Chief Magistrate. One of these, Leon Czolgosz, an anarchist, advanced to meet the President with a revolver concealed in a bandage around his right hand. As he drew near, he fired, the bullet lodging in the muscles of the President's back. President McKinley was removed to the

OUTLINE AND QUESTIONS ON WILLIAM McKINLEY

Outline

I. Early Years

(1) Ancestry and birth
(2) Education
(3) Military career
  (a) Enlistment
  (b) Battles in which he took part
  (c) Bravery
  (d) Promotion
(4) As a lawyer

II. Political Career

(1) Prosecuting attorney of Ohio
(2) In Congress
  (a) Attitude on important questions
  (b) Important committee work
  (c) Influence in his party
  (d) McKinley Tariff Act
  (e) Sherman Law
(3) As governor of Ohio
  (a) Policies
  (b) Achievements
(4) Election of 1896
  (a) Candidates
  (b) Issues
  (c) Campaign methods
  (d) Results

III. Administration

(1) Governmental affairs
  (a) Dingley Tariff Act
  (b) Annexation of Hawaii
  (c) Annexation of Tutuila
  (d) Spanish-American War
    1. Causes
    2. Chief battles
    3. Results
  (e) Philippine insurrection
  (f) Hay-Pauncefote Treaty
  (g) Antitrust movement
  (h) Gold Standard Act
  (i) Boxer Rebellion
  (j) Election of 1900
(2) Other affairs
  (a) Galveston flood
  (b) Gold discovered in Alaska
  (c) Grant's tomb dedicated
  (d) Pan-American Exposition
  (e) Assassination of President

Questions

Whom did McKinley twice defeat for election to the Presidency? What were the chief issues in the contest?

Who was Aguinaldo? What famous soldier brought about his capture?

What is meant by the "Boxer" Rebellion? Why was the part taken by the United States in connection with this significant?

When and where was the Pan-American Exposition held? What tragedy took place there?

What future President of the United States was colonel of McKinley's regiment during the War of Secession?

What change took place in McKinley's attitude toward the tariff question? How do you account for it?

What were the chief causes of his first election to Congress? How many times was he reëlected?

What was there unusual about McKinley's campaign methods when he was running for President? Why did he adopt this method?

How much territory did the United States own at the end of his administration which it did not own at the beginning?

What important event does the slogan "Remember the Maine!" recall?

How did the Spanish-American War affect the length of the water route from New York to California?

What future President had much to do with establishing order in one of the new possessions of the United States?

home of J. J. Milburn, president of the exposition company, and for a week eminent surgeons and doctors did their best to save his life. On September 14, 1901, he passed away. His last words were, "It is God's way; His will be done, not ours." His death was mourned by the whole civilized world, and memorial services were held in England, France and other countries. Burial was at Canton, Ohio, which had been his home since 1867. A statue of him, by Hermon MacNeil, was unveiled at Columbus, Ohio, in 1906 and the splendid mausoleum at Canton was completed in 1908. W.F.Z.

Consult Olcott's *The Life of William McKinley.*

MACLAREN, *m'klair'en,* Ian, the pen name of John Watson (which see).

MACLEOD, *ma kloud',* an important town in the southwestern part of Alberta. It is the junction point for the Crow's Nest Pass and the Calgary-Macleod branches of the Canadian Pacific Railway, and will soon be served by a branch of the Canadian Northern Railway. By rail it is 108 miles south of Calgary, 132 miles west of Medicine Hat and thirty-two miles west of Lethbridge. It is one of the district headquarters of the Royal Northwest Mounted Police and the chief town of a provincial judicial district. Old Man River, which is not navigable, flows through the town. Population in 1911, 1,844.

The section surrounding Macleod is devoted largely to farming and ranching, though some attention is given to the coal deposits. Grain elevators and flour mills are the most conspicuous industrial plants. Natural gas for the city's industries is supplied from the Bow Island field. The town owns and operates its waterworks, electric light and sewerage systems. The most prominent building in Macleod is the courthouse. The town was founded about 1874, and was incorporated in 1892.

MACMAHON, *mak ma oN',* Marie Edme Patrice Maurice de, Duke of Magenta (1808-1893), marshal of the French army and the second President of the third French republic. He was of Irish descent and was educated at the military college of Saint Cyr. His early military career was brilliant. The defeat of the Austrians at Magenta and Solferino in 1859 was mainly due to his leadership. During the Franco-German War in 1870 he displayed little ability, however, and was finally compelled to surrender at Sedan, with 120,000 men. As a statesman after the war, he showed himself without true political insight, and failed to unite the conflicting elements by which he was surrounded. He relinquished the Presidency after holding the office one term, from 1873 to 1879, and retired to private life.

McMASTER, *mak mas'ter,* John Bach (1852-), an American historian and professor of American history. He was born in Brooklyn, was graduated at the College of the City of New York in 1872, subsequently becoming known as a writer on engineering subjects. From 1877 to 1883 he was engineering instructor at Princeton College, and was chosen in the latter year as professor of American history at the University of Pennsylvania, which position he still occupies. His *History of the People of the United States,* which has become a standard work, appeared in part in 1883, and covered the period from 1783 to the War of Secession; it was completed in 1913, in eight volumes. In 1905 he became president of the American Historical Association, and he is also a member of the National Institute of Arts and Letters. Among his published works are *Origin, Meaning and Application of the Monroe Doctrine; Benjamin Franklin as a Man of Letters* and *High Masonry Dams.*

McMASTER, William (1811-1887), a Canadian banker and philanthropist, a liberal patron of literature and art, founder of McMaster University, a coeducational school at Toronto. McMaster was born at Tyrone, Ireland, and received a careful education in a private school. At the age of twenty-two he emigrated to Canada, where he worked for two years as a clerk before engaging in business for himself. He began his business career with a capital of brains, energy and good habits. In the management of his business affairs he was always cautious, but whenever expansion was necessary was never niggardly. After making a large fortune in mercantile pursuits, he became one of the founders of the Canadian Bank of Commerce and as a banker added greatly to his already large fortune.

In 1862 McMaster entered public life as a member of the legislative council, and later became a senator. Public life was not particularly to his liking, but he always had a keen interest in educational matters and in 1865 became a member of the council of public instruction. When the senate of the University of Toronto was reorganized in 1873 he became one of its members. He was well known for his benefactions to the Baptist Church.

MacMONNIES, *mak mun' iz,* Frederick (1863-), an American sculptor, the creator of many portrait busts and statues and of im-

posing fountains. Through the medium of bronze and marble he has given life to old myths, and has idealized Grecian heroes, nymphs and dancing fauns. The *MacMonnies Fountain* for the Court of Honor at the Columbian Exposition, held in Chicago in 1893, won him lasting distinction. No poet ever took more pains than MacMonnies to secure fitting and precise expression for his ideas. Before submitting the new public fountain for Denver he made and destroyed five earlier models. His statue of *Sir Harry Vane,* in the Boston Public Library, and of *Shakespeare,* in the Congressional Library at Washington, are two of his other famous works. MacMonnies was born in Brooklyn, and at the age of three began to show signs of artistic genius. At that time he modeled horses with crumbs of bread and lumps of wax and painted flowers. He studied first under Saint Gaudens, and later went to Paris. He now lives in France, in the retirement which he courts and loves. MacMonnies has also shown great ability as a painter. The reader will find an admirable appreciation of this eminent sculptor in Lorado Taft's *History of American Sculpture.*

MacNAB, Sir Allan Napier (1798-1862), a Canadian soldier and statesman, for many years one of the leading Conservatives in the old legislative assembly, and from 1854 to 1856 joint Premier with Auguste N. Morin. The MacNab-Morin Ministry, although not a long one and not considered especially strong, was responsible for some of the greatest legislation on the statute books of Canada. MacNab is not one of the greatest figures in Canadian history, but circumstances made him a leader at times when history was being made.

MacNab was born at Niagara, Ont. While he was still a boy in school, the War of 1812 stirred his desire to show his loyalty to his country, and in 1813 he enlisted in the British navy as a midshipman. He soon left the navy and served in the army during the remainder of the war. After peace was declared MacNab began to study law and was finally admitted to practice. He first came into the public eye in 1830, when he refused to testify in regard to disturbances in Hamilton following a parade of Sir John Colborne's effigy through the streets. In the same year he was elected to the assembly for Upper Canada, and from 1837 to 1841 was speaker of that body.

As colonel of militia MacNab took a conspicuous part in suppressing the Rebellion of 1837. He was in command at Niagara when the *Caroline,* an American boat, was armed and used to assist the rebels. By his orders the boat was seized, set afire, and allowed to plunge over Niagara Falls. For his services during the rebellion he was knighted. After the union of the two Canadas in 1841 Sir Allan was leader of the Conservative opposition in the assembly until 1844, when the Liberals were defeated in the general elections and he was elected speaker. In 1845 he introduced the Rebellion Losses Bill, which was aimed to compensate those persons who had suffered a loss in property during the Rebellion of 1837 in Upper Canada. This bill met great opposition. It was said to place a premium on rebellion, and finally caused the downfall of the Conservatives in 1848. In that year Sir Allan's service as speaker came to an end. He continued, however, to sit in the assembly, and in 1854, on the resignation of Sir Francis Hincks, was called on to form a Ministry.

The new MacNab-Morin Ministry at once took up several great obstacles to progress in Canada. Two of these, the clergy reserves and seigniorial tenure, demanded quick action, and the bills providing for the secularization of clergy reserves and the abolition of seigniorial tenure passed the assembly on the same day. To John A. Macdonald, then attorney-general, belongs the chief credit for these measures (for clergy reserves see Ontario, subhead *History;* for seigniorial tenure, see Quebec [province], subhead *History*). After his resignation from the Premiership MacNab was created a baronet, and spent three years in England, but in 1860 returned to Canada and was immediately elected to the legislative council. During the session before his death he was speaker. W.F.Z.

MACON, *ma'kon,* Ga., the county seat of Bibb County and one of the most rapidly growing manufacturing centers of the South. It is situated on the Ocmulgee River, only six miles from the geographical center of the state; locally it is called the *Heart of Georgia.* By rail Atlanta is eighty-three miles northwest, Augusta is 125 miles northeast, and Savannah is 191 miles southeast. Through the service of the Georgia Southern & Florida; the Southern, Macon & Birmingham; the Georgia, Macon, Dublin & Savannah; the Macon & Birmingham, and the Central of Georgia railways it ranks next to Atlanta as the railroad center of the state. The river is navigable from Macon to the sea throughout the year. Negroes form thirty-five per cent of the population, which increased from 40,665 in 1910 to 45,757 in 1916

(Federal estimate). The area exceeds nine square miles.

Commerce and Industry. Seven miles above the city the river has a fall of ninety feet, furnishing ample power for manufacturing purposes. Macon lies in the midst of a rich agricultural district which produces cotton, fruit and vegetables. As an inland cotton market it ranks fourth in the United States; the cotton manufacturing industry is rapidly growing and promises to rival that of Northern cities; its various factories employ about one-quarter of the city's wage earners. Next in importance are the manufactories of cottonseed products, which include cottonseed oil, cottonseed meal and cake, compound lard and soap. The lumber and planing-mill products, too, are important, and the manufacture of bricks exceeds that of any other city in the southeast. The largest vein of kaolin in the United States is found within a few miles of Macon, and there are forests of yellow pine and hardwood and hills of granite in the vicinity. Macon is located on the border of the noted Georgia peach belt and ships great quantities of peaches and other fruits each season. The city has the largest greenhouses in the South.

Buildings and Institutions. In addition to the public school system and two libraries, Macon's educational enterprises include Wesleyan Female College, the oldest chartered female college in the world (1836); Mercer University (Baptist); Saint Stanislaus College (Roman Catholic); Mount De Sales Academy, and the State Academy for the Blind, which has an extensive library. Noteworthy buildings are the $306,000 Federal building, erected in 1908, the handsome city hall and auditorium, a $500,000 hotel, the Y. M. C. A. building, Saint Joseph's church, a Home for Aged Masons and the Union passenger station, completed at a cost of $1,000,000.

History. The site occupied by Macon was visited by Hernando De Soto in 1540. In the same year this was the scene of the first Christian baptism in America and of the firing of the first cannon on American soil, so far as known. In 1822 the first settlement was made; the following year it was incorporated as a town, and in 1832 a city charter was granted. It was named in honor of Nathaniel Macon, an American political leader. W.H.C.J.

MADAGASCAR, *mad a gas' kar,* the largest island in the west Indian Ocean, a country of many half-civilized tribes. It is the third largest island in the world, having an area of 228,000 square miles, nearly as great as that of the Canadian province of Alberta, and four times that of the state of Michigan. Its length is equal to the distance between New York and Chicago, and in width it would extend from Milwaukee to Saint Louis. The island is owned by France.

Madagascar is divided into three distinct parts as to its surface features. The *eastern region* is mountainous, having short rivers, marshy valleys and frequent rains. There are dense forests of bamboo and rosewood, filled with ferns and hung with parasitic orchids. The

raphia palm, so useful to the native for his buildings, the cocoanut palm, papaws, mangoes and tanghinia are abundant. The east coast is very regular, having only three places of access for ships. Its many shallow lagoons are the fishing grounds of the natives. Tamatave has one of the few good harbors. The *central region* is a saucerlike plateau of glittering red clay, broken by cone-shaped volcanoes and mountains containing gold, iron, copper, lead, silver and other minerals, though this great store of wealth has not been extensively developed. The *western region* is comparatively flat; there is a marked dry season, and the land is less fertile.

The animal life of Madagascar is unique, in that African beasts of prey are not found here, as would be expected, owing to the proximity of that continent, but numerous species of lemur are peculiar to the island.

The People. Of the total population of Madagascar, less than one per cent are Europeans and Asiatics. There were in 1911 about 3,225,000 natives, belonging to seven different tribes, ranging in race and intelligence from the enlightened Hovas of Malayan origin to the Baras, a degenerate, warlike African tribe. The Hovas have adopted European customs, are cultivating the country and building up Madagascar's cattle trade. Though polygamy and fetish worship still exist (see FETISH), many of the natives have adopted Christianity. The Europeans are developing manufacturing industries and extending the railroad, telegraph and telephone systems. Wagon roads have been built between the chief cities; there is postal communication throughout the island, and cable communication with Africa, besides three government wireless stations. Commerce with France is growing in importance; of the 10,086 vessels entering the port of Tamatave in 1913, nearly 6,900 were French. Primary education has been made compulsory, and besides more than twenty schools for Europeans, there are nearly 650 native schools.

Government. Madagascar is governed by the French Governor-General, and an administrative council at Antananarivo, the capital. Natives are employed to a large extent as local governors and chiefs of districts. There is no elective assembly and no representation in French Parliament. The natives have district courts, with the right of appeal to higher tribunals, and finally to the Governor-General.

History. No one knows how long Madagascar has been inhabited by its scattered, warring tribes. They jealously guarded their territory, and with the exception of some early Arab settlements, colonization has been of recent date. The turbulent chieftains were united into one kingdom in 1810 by Radama I, their one great king. After his death the native sovereigns proved the inability of the black race to govern themselves and the French colonists brought about intercession by the European powers. In 1890 England recognized the French protectorate of Madagascar (see PROTECTORATE), but the natives stubbornly refused to submit. After troops were sent to the island to enforce the French claims, the ruling queen was deposed, and in 1896 Madagascar became a colony of France; since then there has been a rapid development of its resources and its people. E.B.P.

Consult Matthews' *Thirty Years in Madagascar.*

MADDER, *mad'er,* a group of plants native to the warmer parts of both hemispheres, formerly of great economic importance because of the coloring matters, alizarin and purpurin, found in their roots. Owing to the recent development of the artificial manufacture of alizarin (which see), madder preparation have been almost eliminated. The most important species of the plant is *dyer's madder,* cultivated in European countries, in the East Indies and in China. It flowers year after year, producing small greenish-yellow blossoms, black fruit and rough, prickly leaves. From the roots of a species cultivated extensively in Holland is obtained the much-admired Turkey red dye. By the use of a mordant (which see) madder colors varying from pink through red and yellow to purple and brown may be obtained.

MADEIRA, *ma de'ra,* an island off the northwest coast of Africa in the North Atlantic Ocean, the largest of the Madeira group, all of which belong to Portugal. It is 620 miles southwest of Lisbon, Portugal, and 280 miles north of Teneriffe, in the Canaries. It is about thirty-eight miles long and twelve miles wide, and has an area of 315 square miles. The mountain range which extends across it rises gradually from the shore to its highest point, the Pico Ruivo, 6,050 feet above the sea; the average peak elevation of the mountains is 4,000 feet. The snow-crowned summits of the highest peaks lend an element of grandeur to the picturesque beauty of the island, with its many deep valleys and steep and rocky shores.

Madeira abounds in date palms, bananas, Indian corn, custard apples, figs, pomegranates, sugar and coffee. The grape disease has interfered greatly with the principal industry of the island in recent years, and the export of wine is less extensive than in former years. The climate, which is famed for its constancy and healthfulness, attracts many who suffer from diseases of the chest; the temperature differs only 10° between winter and summer. Funchal, which has a population of about 25,000, is the capital and the port of the island. The inhabitants are of mixed Portuguese, negro and Moorish descent; they are strong and industrious, but the majority are uneducated.

The Portuguese word *madeira* means *timber,* and the island is so called on account of the abundant forests which formerly covered it. Madeira was discovered by the Portuguese in 1420, and its colonization was soon begun under the direction of Prince Henry the Navigator. Population, 1911, 169,800.

MADEIRA RIVER, a majestic river of South America, the largest tributary of the

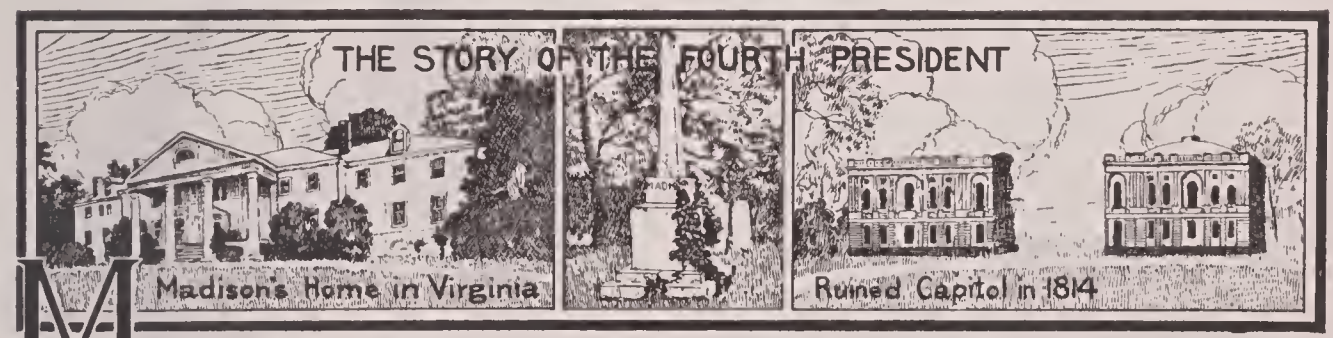
Amazon River. It is formed by the union of several smaller rivers on the boundary between Brazil and Bolivia, and its general direction is northeast. Its principal tributary is the Rio Teodoro, formerly the Rio Duvida (River of Doubt), which was made known to the world by the Roosevelt-Rondon scientific expedition in 1914. This latter stream, 1,000 miles long, had previously been known to the natives, but Theodore Roosevelt was the first white man to explore it. The Madeira River is about 2,000 miles long, and at its mouth is nearly two miles wide and sixty-five feet deep. It is navigable up to a point about 480 miles from its mouth, where magnificent cataracts occur; beyond this point navigation is again resumed. It is named Madeira, which is Portuguese for *wood,* because of the quantity of driftwood sent down by the current.

MADERO, *mah da' ro,* Francisco (1873-1913), a President of Mexico following his leadership of the revolutionary movement which deposed Porfirio Diaz, who had been at the head of the government for more than a generation. Madero was born in San Pedro, of a wealthy family which gave him a good education. He was a liberal in politics and always an idealist. Having become interested in politics as a result of fraudulent elections in 1903 and in 1908, he published a book in which he attacked the policy and administration of President Diaz. The book was immediately suppressed, but his open attack made him the only possible candidate against Diaz in 1910, and the supporters of the president promptly had him arrested on absurd charges, on June 27, 1910. He was released too late to take part in the election, but immediately issued *The Plan of San Luis Potosi,* advocating effective suffrage and no reëlection, but appealing for an uprising. He was forced to flee to the United States, but his adherents opened the revolution and Madero returned to direct the campaign. He was successful, and Diaz, seeing the futility of further resistance, finally made peace in May, 1911.

In October Madero was unanimously elected President, but throughout his administration he was harassed by revolutions. General Huerta, commander of the government troops, deserted him, and in 1912 Madero and the Vice-President were arrested and forced to resign. On February 23, 1913, while being transferred from one prison to another, they were both murdered. No satisfactory explanation of this outrage was offered, but it is generally understood that Huerta instigated the act.

Related Subjects. The reader is referred to the following articles in these volumes

Diaz, Porfirio
Huerta, Victoriano
Mexico, subtitle *History*



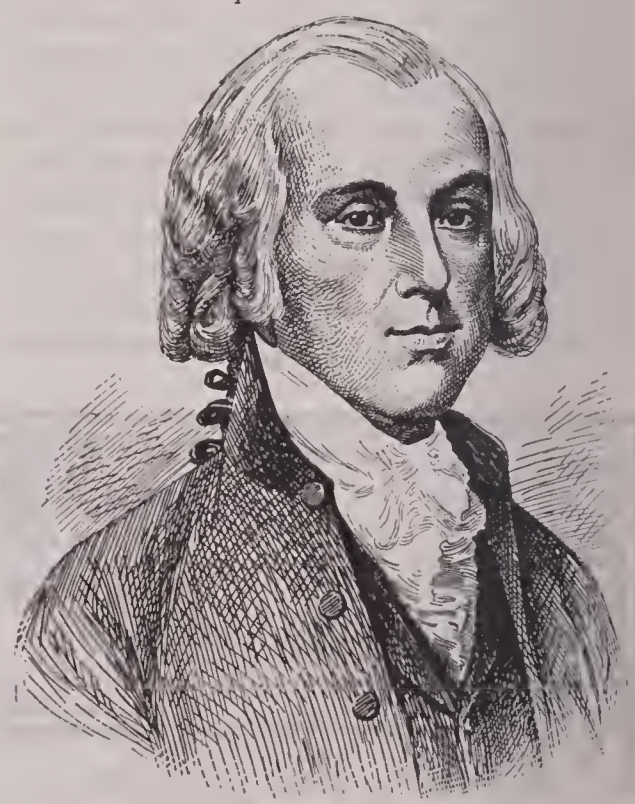
MADISON, James (1751-1836), an American statesman, one of the ablest of the younger men who were conspicuous during the Revolutionary War and the period following it, one of the contributors to the *Federalist,* "Father of the Constitution," author of the Virginia Resolutions, Secretary of State for the eight years of Jefferson's Presidency, and finally himself President of the United States. Madison is not one of America's popular heroes. Even in his own lifetime, although his ability won cordial recognition and confidence, he did not win the affections of the people to the degree, for example, to which Jefferson did. His reputation suffered, moreover, from the misfortunes which befell American arms in the War of 1812, and it has never fully recovered. Yet Madison's career is one of the brightest in the early years of the United States, and his fame will never perish, if for no other reason than that he was the "Father of the Constitution." He was not an intrepid statesman, but "his calm good sense," as the historian Ticknor says, "and the tact with which he could adapt theory to practice were among his prominent characteristics." Jefferson said of him that "with consummate powers was united a pure and spotless virtue." In practice he sometimes fell a victim to party politics, but in theory he was just and keen. He was a clever diplomat, a graceful

writer, a man of varied and expert wisdom, a good friend and a faithful officer of the government.

His Youth. James Madison was born at Port Conway, King George County, Va. His father, a man of some local reputation, was a landowner and had served in various minor county offices. Young James had the advantage of considerable instruction at home, and in 1769 entered the College of New Jersey (now Princeton University). At college he was a keen student of ancient governments. He was graduated in 1771 and spent the next year in graduate study. Returning then to his father's house he continued his voluminous reading in history and constitutional law, his object apparently being to prepare himself for public life. In 1774, when he was only twenty-three years old, he accepted his first political appointment, a membership of the Committee of Safety of his county. For more than forty years thereafter, except for one brief interval, he was continuously in public office.

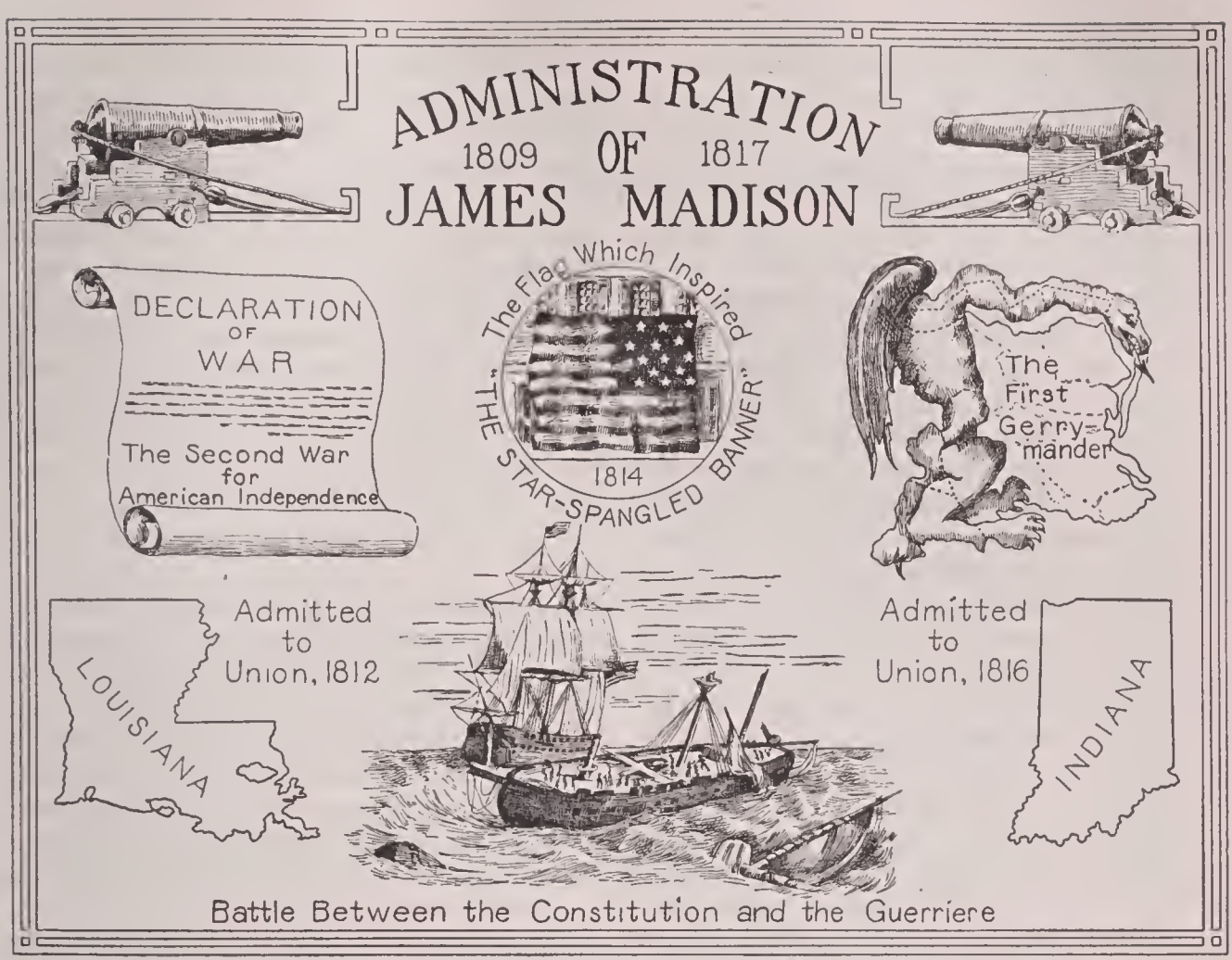
Long Service as a Legislator. In 1776 Madison was a delegate to the Virginia convention and a member of the committee to draft a state constitution. In the work of this committee he rendered valuable assistance to Thomas Jefferson in his effort to secure complete religious toleration. After the adoption of the constitution Madison was elected to the first general assembly, and in 1777 was given a place in the council of state by Patrick Henry, who was then governor. By 1780 his prestige had grown to such a degree that he was chosen as one of Virginia's delegates to the Continental Congress. In the Congress he was conspicuous. Still young, but prudent, sagacious and acute, he was a statesman of a high order, and in influence was second to none. His voice was authoritative on the tremendous problems, both internal and external, which were vexing the newborn nation. He insisted that Spain permit free navigation of the Mississippi River by American vessels, opposed the further issue of paper money by the states, and strongly urged the extension of the powers of Congress. In 1781, when Congress was appealing to the states for power to impose a small duty—five per cent—on importations, to add to the government's meager funds, Madison spoke with a scholar's calm in support of the measure. "It is needless," he said, "to go into the proofs of the necessity of paying the public debt; the idea of erecting our national independence on the ruins of the public faith and the national honor must be horrid to every mind which retains either interest or pride."

From 1784 to 1786 Madison served in the Virginia assembly, but in 1787 was again elected to the Continental Congress, and in the same year was a delegate from Virginia to the Constitutional Convention at Philadelphia. In that body he rendered such noteworthy service that he became known as the "Father of the Constitution." He was the author of the "Virginia plan," which provided that representation in both branches of the national legislature should be on the basis of population. This plan was defeated, but Madison was instrumental in forcing the delegates from the smaller states to accept representation by population for the House of Representatives. After the adjournment of the convention Madison performed a service perhaps even more valuable—the writing of the *Federalist* in coöperation with Alexander Hamilton and John Jay. About one-third of these essays were written by Madison (see FEDERALIST, THE). In addition to his other work in the convention Madison took notes on the debates, thereby creating an invaluable record in the constitutional history of the United States.



JAMES MADISON
First "war President" of the United States.

On his return to Virginia from Philadelphia Madison was chosen a delegate to the state convention which was to vote on the adoption of the new Constitution. He led the supporters of the Constitution, and secured its ratification. The Anti-Federalists, however, were



strong enough to prevent his election to the Senate, but he was elected to the House of Representatives, his opponent being James Monroe. During the eight years of Washington's Presidency, 1789-1797, Madison served in the House. At first a Federalist, he later opposed many of the administration's policies and became the leading ally of Jefferson. Washington in 1794 offered him the Secretaryship of State, but the offer was declined because Madison was satisfied with his position in the House of Representatives. There the direction of business was left largely to him. He proposed the resolutions creating the departments of State, the Treasury and War, proposed a series of amendments to the Constitution out of which grew the existing first ten amendments, and had considerable voice in framing the first tariff act. In short, much of the principal legislation of the period was either drafted or introduced by him.

The Virginia Resolutions. For four years, 1797 to 1801, broken only by a few months of service in the Virginia assembly, Madison lived in comparative retirement at his home. During these years he wrote occasionally for the press, and made one remarkable contribution to political literature. This contribution is generally known as the Virginia Resolutions (see KENTUCKY AND VIRGINIA RESOLUTIONS), which were adopted by the Virginia assembly in 1798 as a protest against the Alien and Sedition laws in particular and the extension of Federal authority in general. These resolutions were transmitted to the authorities of the other states, and the replies of the latter were referred to a legislative committee of which Madison was chairman. It is worthy of note that of the seven states which replied only one, Vermont, denied Madison's view that the Union was a compact between sovereign states.

Madison as Secretary of State. For a number of years Madison had been regarded as Jefferson's chief lieutenant. It was natural, therefore, when Jefferson became President, for him to appoint Madison his Secretary of State. For eight years the latter directed the nation's foreign affairs with a wise and steady hand. This was a period of changing conditions, at home and abroad, which demanded constant watching.

By far the most troublesome problems which confronted Madison concerned the attitude of England toward certain accepted principles of international law. In dealing with these prob-

lems, Madison's skill as a diplomat was of little avail, for the nations of Europe were engaged in a great war and were in no position to consider legal points. While the United States was endeavoring to maintain its rights the election of 1808 made Madison the fourth President. He was Jefferson's choice, and was easily elected, receiving 122 out of 175 electoral votes.

The Administrations of James Madison, 1809-1817. The problems which Madison had left unsolved as Secretary of State were now left for his consideration as President. Madison was well fitted to be President. From his college days he had been a student of law and government, and during his long career as a legislator had put many theories into practice. He had, moreover, received valuable training in handling international questions during his eight years' service as Secretary of State. From another point of view, the social side, Madison had the additional qualification of a charming wife. He married, in 1794, Dorothy Payne Todd, who, as "Dolly" Madison, became the leader of a brilliant society in Washington.

During the whole of Madison's administration, however, the shadow of war hung over the land. At the close of Jefferson's administration the attitude of France and England toward American shipping had already brought the relations of those countries with the United States to a critical point. Almost immediately after he entered office Madison had issued a proclamation forbidding all communication with France and England until those countries should repeal certain decrees and orders in council which interfered with American rights on the high seas. Practically the entire four years of Madison's first term were occupied in negotiations with those countries. The acts of both countries were arrogant, but France never advocated the policy of impressment of American seamen. The Republican party, the party of Jefferson and Madison, then in power, was traditionally friendly to France and hostile to England. The popular feeling against England was fanned by reports from the western frontier that English agents were attempting to arouse the Indians against the United States. Some color to these reports was given by Tecumseh's plan for an Indian confederacy. The resulting campaigns against the Indians, the rise of a new generation of Westerners who were determined to force the issue with England, and the other factors mentioned above—all combined to push Madison along the path to war, a path he was reluctant to follow.

The War of 1812. Finally, in 1812, after England had steadily refused to modify its policy, the United States placed an embargo for sixty days on all exports. This preliminary was followed on June 1, 1812, by a Presidential message to Congress in which were reviewed the many American grievances against England. The President concluded his message by recommending a formal declaration of war. On the eighteenth of June Congress acted on the President's recommendation. On the twenty-third of June, before news of the declaration of war reached England, the British government withdrew the orders in council to which the United States had objected. Efforts were then made, but in vain, to prevent the outbreak of hostilities.

A few months after the beginning of hostilities Madison was reëlected President by an electoral vote of 128 to 89 for De Witt Clinton of New York. Elbridge Gerry of Massachusetts was elected Vice-President. Already, however, Madison's reputation had suffered. There was strong opposition to the war in many sections, especially in New England, where it was customary to speak of "Mr. Madison's war." Madison not only had to endure the blame for a war which he had tried to avoid, but also for the failure of the American armies to win victories. At the outset the Americans suffered serious reverses, and had it not been for a number of glorious victories on the water the score would have been heavily against them. As it was, the treaty of peace, signed at Ghent on December 24, 1814, was ratified with suspicious promptness on the day after it was laid before the Senate. For details of military and naval operations, see WAR OF 1812.

Death of the Federalist Party. During the war there had been much economic and financial distress in the United States. The blockade had ruined shipping and all foreign trade, the Treasury was exhausted, and the nation's credit was most uncertain. The spectacle, too, of the President of the United States fleeing from a British army which sacked and burned the nation's capital, was not a pleasing one. The distress caused by the war and the consequent opposition to Madison's policies were greatest in New England, the Federalists' stronghold. The opposition reached its climax in the Hartford Convention (which see). The secrecy with which its proceedings were carried on led to rumors of disloyalty and brought public disapproval on the leading Federalists. The Battle of New Orleans, followed by the ratification

OUTLINE AND QUESTIONS ON JAMES MADISON

Outline

I. His Youth

(1) Birth and parentage
(2) Education
  (a) Private study
  (b) College

II. Career as a Legislator

(1) Committee of Safety
(2) Virginia general assembly
(3) Continental Congress
(4) Constitutional Convention
(5) Congress of the United States

III. As Secretary of State

(1) Disputes with England

IV. His Administrations

(1) Madison's qualifications
(2) War of 1812
  (a) Its causes
  (a) Important battles
  (c) Internal problems involved
  (d) Hartford Convention
  (e) Treaty of Peace
    1. Question of impressment of seamen not settled
(3) Fall of the Federalist party
(4) Second Bank of the United States
(5) Internal improvements
(6) Tariff of 1816
(7) Louisiana and Indiana admitted

V. Madison's Last Years

(1) Interest in education
(2) Virginia constitutional convention
(3) Death

VI. Writings and Character

(1) *The Federalist*
(2) *Virginia Resolutions*
(3) *Advice to My Country*
(4) Estimates during his lifetime
(5) Later opinions

Questions

What was the *Federalist?* Of how great importance was it?

What was the Virginia Plan? What substitute for it was adopted?

What were the Virginia and Kentucky Resolutions? Who wrote them? Who was President when they were written?

Why was Madison not popular during his second term?

In what year did the British capture Washington? What was Mrs. Madison doing at the time? Why did they not capture the President?

Who succeeded Madison as President?

What were his good qualities? What were the weak points in his character? Are opinions of him to-day more or less favorable than they were during his lifetime?

What was *McCulloch versus Maryland?* Who was John Marshall, and what did he have to do with this?

What is meant by Orders in Council? What part did they play in the War of 1812?

What was the Berlin Decree? The Milan Decree?

Why did not the United States go to war with France as well as with England?

Why was Tecumseh's plan for an Indian confederacy a factor in causing the War of 1812?

What was the "impressment of American seamen?" How was the question dealt with in the Treaty of Ghent?

What important battle of the War of 1812 was fought after the treaty closing that war had been signed?

What future President commanded the American army in this battle?

of the treaty of peace, further added to the unpopularity of the Federalists, and for years the term "Hartford Convention Federalists" was an epithet of reproach. The nation finally realized that the war had been fought in a just cause and that its conduct had not been wholly blameworthy.

Nationalist Tendencies. It is a paradox, but nevertheless true, that the war caused the death of the Federalist party, an organization of nationalist tendencies, but it also compelled the Republicans to adopt these same nationalist political ideas. For a time after the end of the war the country had only one political party, whose principles were derived from those of the two older parties. The general recognition of the broad powers of the Federal government was shown in various ways. First there was a vigorous effort to strengthen the means of national defense. Next there was the chartering of the second Bank of the United States (which see) in 1816, a measure which Madison approved. In the same year Congress began to appropriate large sums of money for public roads and other "internal improvements" which were more or less local in character. On the propriety or wisdom of such appropriations Madison differed from his party. Still another symptom was the tone of judicial decisions, especially the opinion of Chief Justice Marshall in the case of *McCulloch versus Maryland,* in which he gave a clear definition of the relation between the Federal and state governments and stated in detail the court's theory of the supreme and exclusive authority of the former.

One of the most important evidences of the new nationalist spirit was the passage of the first really protective tariff, that of 1816. It was natural that the patriotism called forth by the period of embargo, nonintercourse and war should be followed by a disposition to encourage domestic manufacture of the articles whose foreign supply had been cut off. Madison's views on this subject, as on others, shifted from time to time, but in 1816 he recommended a protective tariff for the encouragement of manufactures. There was as yet, however, neither in Congress nor among the people, a sentiment in favor of permanent protection. There was rather a feeling that assistance should be granted to the manufacturing industries which had arisen during the war. The tariff of 1816 increased the general average of duties to about twenty per cent, as a means of providing interest on the heavy debt caused by the war, and placed higher duties on textile fabrics.

Quiet and Leisure of Old Age. Madison was succeeded as President by James Monroe, who was Madison's Secretary of State, just as Madison had served Jefferson, his predecessor. Monroe received the electoral votes of all but three states, which voted for Rufus King, the last Federalist candidate for President. At the conclusion of his term Madison retired to his home at Montpelier, Va., where he died on June 28, 1836. In his later years he took much interest in education, and was especially eager to develop the University of Virginia. His last public service was as a member of the Virginia constitutional convention of 1829. To the end he remained a distinguished figure, and his wife's charm and the hospitality of their home helped to sustain his prestige. Mrs. Madison survived her husband until 1849. W.F.Z.

Consult Gay's *James Madison,* in American Statesmen Series; Hunt's *Life of James Madison.* John Quincy Adams wrote *The Lives of James Madison and James Monroe,* a valuable book which is still in print.

MAD'ISON, Wis., the capital of the state, the county seat of Dane County and a noted seat of learning, situated in the southern part of the state, about midway between the eastern and western borders. Milwaukee is seventy-five miles east, Chicago is 130 miles southeast and Saint Paul is 268 miles northwest. Three trunk lines serve the city, the Chicago & North Western; the Chicago, Milwaukee & Saint Paul and the Illinois Central railways. In 1916 the population was estimated by the Census Bureau to be 30,699; in 1910 it was 25,531. The area is a little less than six square miles.

Lakes and Drives. Few cities of the United States possess as great natural beauty as Madison enjoys, from its unique location between Lake Mendota (Great Lake) and Lake Monona (Spirit Lake), 845 feet above sea level and 210 feet above Lake Michigan. These two lakes are part of a chain of four lakes linked by the Yahara River; Waubesa (Swan) and Kegonsa (Fish) lakes, complete the chain. Longfellow, in his tribute to "The Four Lakes of Madison," described them in part as—

> "Four lovely handmaids that uphold
> Their shining mirrors rimmed with gold,
> To the fair city of the West."

Seldom does an inland city have so extensive a water front. Above this level, hills and bluffs covered with trees and shrubs rise to an elevation of from forty to 125 feet, and wherever possible this natural beauty has been improved

upon in the parks, which cover 500 acres, and in the miles of remarkable drives about the lakes.

Buildings and Institutions. The city's most attractive ornament is the Capitol, which stands on a hill in the center of a public park, and which for architectural beauty is not surpassed in any other capital city of the United States. Among other prominent buildings are those of the University of Wisconsin, established in 1848 and open to both sexes. This great institution occupies a beautiful site on a tract of land 600 acres in extent, which stretches for one mile along the picturesque shores of Lake Mendota. The State Historical Society is housed in an Ionic structure of Indiana limestone, the construction of which cost $700,000. It contains a valuable collection of historical mementos and the famous reference library of 245,000 volumes, considered one of the best historical libraries in the United States. The libraries of the Wisconsin Academy of Sciences, Arts and Letters and of the State University are also in this building. In addition to these, the city has the State Law and Carnegie libraries, four schools of music, business schools and night schools. The Federal building was erected in 1871. A United States weather bureau station and a forest-products laboratory are located here. In the immediate vicinity are the Sacred Heart Convent, for girls, the State Insane Asylum, a Battle Creek sanitarium and the State Fish Hatchery. See WISCONSIN, UNIVERSITY OF.

Commerce and Industry. Though Madison is widely known as a seat of learning and as a summer resort, its varied industries are also important. The 120 manufacturing houses supply local and foreign markets, and the annual output is valued at about $10,000,000. Among these products are agricultural implements, machine tools, gas and oil engines, lubricating devices, electric supplies and building materials. Owing to its geographical location between Chicago and the Twin Cities, Minneapolis and Saint Paul, and to the exceptional shipping facilities offered by nine branches of the three trunk lines serving the city, Madison has become a distributing center of importance. It is a wholesale lumber point and occupies the center of the tobacco-growing region of the state. The surrounding territory also produces lead, zinc, iron ore, grain, silica, sand and flax.

History. In 1836 this site was chosen for the state capital, and in 1837 the first house was built and occupied by the workmen engaged in the construction of the Capitol. Two years later the building was completed, and Madison has since been the seat of government for the state. It was incorporated as a city in 1846, and named for James Madison, fourth President of the United States. A.H.M.

MADON'NA AND HER BABE, the most revered subject in the world of religious art as well as in the world of reality. In the Madonna of art is found the glorification of the motherhood and mother love of the race. As nothing else makes so universal an appeal as a mother and child, century after century artists have poured out their souls in this beloved theme. Madonna paintings are so numerous that it is impossible to estimate their number. Every gallery of any consequence has its study of Mary and her Babe, representative of some great school of art. However, the greatest Madonna paintings are of the Renaissance, that marvelous period of the awakening of art, religion and learning in which the medieval age merges into the modern. The Madonnas of to-day are comparatively few in number, for the men and women of the twentieth century are more concerned with men than with saints; their interest centers not upon the hereafter, but the present. And so their art concerns itself not with painting virgin mothers, saints and angels, but with the things that lie close to material existence.

Students of Madonna art generally divide the paintings into five classes, according to the general styles of treatment:

(1) The *Portrait Madonna,* in which the figures are in half length against an indefinite background. In this division are grouped the first Madonna paintings. They are of Byzantine or Greek origin, and an example is to be found in every old church in Italy. The Virgin is a half-length figure against a background of solid gold leaf, or studded with cherubs. She is pictured in a robe of blue, starred or marked with gold and usually draped over her head. To see one is to know all.

(2) The *Madonna Enthroned,* which constitutes the largest class, represents the Madonna sitting on some sort of throne or dais. Every school of Italian art is also included in this division, and an astonishing variety of form is revealed. To this group belong Cimabue's *Madonna,* painted in 1270, and hanging in the Church of Santa Maria Novella, at Florence; Bellini's *Madonna of San Zaccaria* at the Venice Academy; Andrea del Sarto's *Madonna of the Harpies,* in the Uffizi Gallery, Florence; Perugino's *Madonna and Saints,* in the Vatican Gallery; Paul Veronese's *Madonna and Saints,* in the Venice Gallery, and *Madonna and Child* by Quinten Massys, in the Berlin Gallery.

(3) The *Madonna in the Sky,* or the *Madonna in Gloria,* where the figures are set in the heavens, represented by a glory of light, by clouds, or a company of cherubs, or by simple elevation above

the earth's surface. The glory was originally set in a sort of nimbus, surrounding the entire figure instead of merely the head; it was generally oval in shape. Representative paintings of this class are Raphael's *Sistine Madonna*, in the Dresden Gallery; Fra Angelico's *Madonna della Stella* in the monastery of San Marco, Florence; Correggio's *Madonna of Saint Sebastian*, in the Dresden Gallery; Moretto's *Madonna of San Giorgio Maggiore*, at Verona; Bouguereau's *Madonna of the Angels*.

(4) The *Pastoral Madonna* has a landscape background, of which Raphael again heads the list with his *Belle Jardiniere* (The Beautiful Gardener) of the Louvre Gallery, *The Madonna of the Meadow* in the Belvedere Gallery, Vienna, and the *Madonna of the Goldfinch*, of the Uffizi, Florence. Among other famous paintings of this division are Leonardo da Vinci's *Madonna of the Rocks* in the National Gallery, London; Palma Vecchio's *Santa Conversazione*, at the Dresden Gallery, and Filippino Lippi's *Madonna in a Rose Garden*, in the Pitti Palace, at Florence.

(5) *Madonna in a Home Environment,* which forms but a small group. The Northern painters, home loving in their tastes, idealized the type, and we find in this list Quinten Massys' *Madonna*, presenting a Flemish bedroom of the fifteenth century; Schongauer's *Holy Family*, in the Belvedere Gallery, at Vienna, and Rembrandt's *In a Carpenter's Home* in the Munich Gallery.

Legend credits Saint Luke with having painted the first Madonna. But it was not until after the Council of Ephesus, in A. D. 431, that paintings of the Virgin and her Babe became the recognized symbols of the orthodox faith, and Madonnas began to increase in great numbers. The oldest representations of the Virgin that survive are those found in the catacombs accompanying the tombs of the early Christians. Byzantine models were followed up to the thirteenth century, when, with the dawn of the Italian Renaissance, the old-style portrait Madonna passed out of vogue. More elaborate backgrounds were introduced with the growing resources of technique. This was the time of Cimabue of Florence, the father of modern painting. He was the first to put natural life into the angular designs of the Byzantine artists, and with him began that wonderfully productive period of Italian art, with Madonna subjects as the chief source of inspiration, culminating in Raphael's great *Sistine Madonna*. Raphael is the world's greatest painter of Madonnas. His masterpiece, the *Sistine Madonna,* painted in 1518, now hangs in the Dresden Gallery. Its theme is the transfiguration of loving and consecrated motherhood, and represents the Virgin supported on clouds and carrying the infant Jesus in her arms. On one side Pope Sixtus II kneels in supplication. At the other side Saint Catharine kneels, and below, the two famous cherubs of Raphael are leaning. It was painted as an altar piece for the Church of San Sisto at Piacenza, and was finished just before the master's death. This Madonna is perfect in poise and character.

It is said that Raphael first painted his *Madonna of the Chair* upon a barrel and then copied it on canvas. It was painted in 1516 and now hangs in the Pitti Palace, Florence. The Virgin is seated in a chair, clasping Jesus in her arms, while Saint John is depicted in adoration at the left. His *Madonna di Ansidai*, painted in 1506, the finest in England, is in the National Gallery, London. It is sometimes called the *Blenheim Madonna,* because it was purchased there in 1844 for $350,000. In the *Belle Jardiniere* (Pretty Gardener), in the Louvre, the Virgin is seated in a meadow among flowers. She is looking at the Infant, who stands at one knee; at the other, Saint John kneels, holding a cross. Others of Raphael's fifty Madonna paintings are *The Madonna of the Goldfinch* of the Uffizi, Florence; *The Madonna in the Meadow,* in the Belvedere Gallery, Vienna; and the *Colonna Madonna,* the gift of Mr. Morgan to the Metropolitan Museum, New York City.

Leonardo da Vinci was doubtless Raphael's greatest inspiration, but the former is always mysterious and subtle, the latter frank and clear. Of Da Vinci's famous Madonnas, only two remain. His *Madonna of the Rocks,* in the National Gallery, London, takes its name from the appearance in the background of a grotto, with high rocks. The Virgin is presenting the infant John to Jesus, who, supported by an angel, is blessing him.

Correggio Madonna paintings are large compositions crowded with figures expressing great gladness and gayety. The fame of these rests not so much on their inner significance as upon their splendid technique; they are unsurpassed for masterly handling of color. Among his famous paintings are *Madonna of Saint Sebastian* in the Dresden Gallery; *La Zingarella* at Naples; *Madonna della Cesta* in the National Gallery, London; and the *Madonna della Scala*. The latter picture was originally painted in fresco over the eastern gate of Parma. Later the wall which it decorated was incorporated into a small, new church. To accommodate the high level of the Madonna, the building was somewhat elevated, and being entered by a flight of steps, was known as S. Maria della Scala (of the staircase). This name attached itself to the painting even after the church was

destroyed in 1812, and the fresco removed to the town gallery.

Titian ranks next to Raphael and Correggio in his portrayal of the Virgin. In his *Madonna with Roses,* in the Uffizi Gallery, Florence, the Babe holds his two little hands full of roses which his cousin, Saint John, has brought him, and the mother smiles gently at the eagerness of the two children.

But to return to the earlier schools. Fra Filippo Lippi, the gay artist-monk, was the first to portray the incarnation of mother love and childish innocence. Many of the famous art galleries of Europe hold as their treasures Madonna paintings from his able brush.

Giovanni Bellini, of the Venetian school, is known throughout the world for his enthroned Madonnas. Of his painting for the chapel in San Giobbe, but now hanging in the Venice Academy, Ruskin said that it was "one of the greatest pictures ever painted in Christendom in her central art power." It is a large composition with three saints at each side and three choristers below. His *Madonna between Saint George and Saint Paul,* in the Venice Academy, is accounted among the rare treasures of Italian art.

Botticelli's *Madonna of the Pomegranate* in the Uffizi, Florence, shows the figures at half length. The Virgin, encircled by angels, holds the Child half reclining on her lap. Her face is sad, as is characteristic of the Madonnas of this master, and the Child has absorbed her mood.

The artists of Northern Europe did not produce many great Madonnas, and few now remain. In their art the Virgin invariably wears a crown, whether she sits on a throne or is placed in a pastoral environment. Their foremost example is the celebrated Holbein Madonna of Darmstadt, known as the *Madonna of Burgomaster Meyer,* now in the Dresden Gallery. The Madonna wears a high, golden crown, embossed and edged with pearls. This noble figure sums up the finest elements in the Madonna of the North. Other Madonnas not to be overlooked of this school are those by Van Eyck and the woodcuts of Albrecht Dürer.

Murillo is the foremost representative of the Spanish school. He alone of the seventeenth century kept alive the pure flame of religious fervor imbued by the devout Italians of the early school. Examples of the best of his art are to be found in the Pitti Gallery, Florence, and in the Louvre, Paris.

Of the modern schools, Defregger, Bodenhauser, Bouguereau followed Raphael in representing the Queen of Heaven as a full-length figure in the sky, but their conceptions lack the dignity of Raphael, the master. R.D.M.

Consult Karoly's *The Madonnas of Raphael;* Hurll's *The Madonna in Art.*

MADRAS, *ma drahs',* the capital of the province of Madras, on the eastern coast of the Peninsula of India. It is the third city in size and importance of India, exceeded only by Calcutta and Bombay, and although it has a large sea trade its anchorage for vessels is poor. A great deal has been done to improve the harbor, yet it is so unsafe during the cyclones that occur so often on its coast that the larger ships are always warned to put to sea. In spite of this drawback Madras has a large trade in cotton, rice, coffee, hides and skins, a great many of these products coming from the interior on the three canals and the several railroads that center there.

Though the Portuguese founded the village of Saint Thome, now a part of Madras, in 1504, the city itself dates from 1639, when an Indian *rajah* granted some land to a British subject. A fortified factory was built, and soon a village grew up around it, which became the chief English settlement on the coast, with a large body of English and native troops, civil authorities and a customs house. Madras has two large universities, several fine churches, a large native hospital and many fine public buildings. Population, 1911, 518,660.

MADRAS, a province in the southern end of British India, extending along the Bay of Bengal on the east, with a long, narrow strip touching the Arabian Sea on the west, and bounded by the provinces of Mysore, Hyderabad and Orissa on the north and northwest. It has an area of about 141,726 square miles, nearly equal in size to the combined areas of North and South Dakota, and over half as large as the province of Alberta. The Eastern and Western Ghats and the Nilgiri Mountains cover a great part of its surface, the remainder being a high plateau. The principal rivers are the Godavari and Kistna, with their tributaries, which, with the aid of irrigation, furnish moisture to fields of cotton, spices, sugar cane, rice, fruit, wheat and tea. Besides its variety of crops, Madras boasts of forests of valuable wood, and mineral products, among which are iron, gold, lead, garnet, diamonds and copper.

Early in the fourteenth century the Mohammedans invaded this territory, and later the British, French and Dutch fought there for supremacy, the former eventually coming into

undisputed possession. By the end of the nineteenth century revolts among the native tribes had been completely suppressed. The inhabitants of the province, numbering about 41,500,000, are under a governor, who is in turn under control of the British Viceroy of India. They live in small villages, each of a few hundred inhabitants, and have eight or ten languages, besides numerous dialects. Although a great

MADRAS

a—Kashmir	*h*—Central Provinces
b—Punjab	*i*—Berar
c—North West Frontier Province	*j*—Hyderabad
d—Rajputana	*k*—Mysore
e—Bombay	*l*—Bengal
f—Central India Agency	*m*—East Bengal and Assam
g—United Province of Agra and Oudh	*n*—Burma

proportion of the population is wholly uneducated, schools are beginning to gain a foothold. In 1911 and 1912 there were 5,752 males and but forty-nine females in the colleges, although there was not such a comparative difference in the numbers attending elementary schools. Madras University, a body of examiners, is at the head of educational institutions in the province and grants degrees in engineering, law, medicine and arts.

MADRID, *ma drid'*, a city situated on a high plateau, 2,150 feet above the sea, swept during the winter months by icy winds from the snow-capped mountains on the north and in summer exposed to a burning sun. It can lay its only claim to the honor of being the capital of Spain to its fortunate location in the central part of the peninsula. It is almost equidistant from the Mediterranean, the Atlantic and the Bay of Biscay, and in a direct line it is about 860 miles west of Rome and about 660 miles southwest of Paris. By way of Lisbon, Portugal, it is 3,350 miles from New York. Madrid is a very modern city, with but few landmarks of its medieval days. Its general aspect is clean, and an air of gayety pervades the city. Some one has said that the inhabitants include two classes—those who go to bed after 3 A.M., and those who get up before four. The streets are never quiet.

As compared with other capitals, Madrid has very few structures of much interest architecturally or otherwise. Of the secular buildings, the most magnificent is the royal palace, in Tuscan style, forming a square of 489 feet and enclosing a court of 140 feet. In conjunction with the palace is the royal armory, containing the finest military collection in the world, a reminder of the former glories of Spain, and the royal stables and coach houses, remarkable for their extent. Chief among the many squares, which form an attractive feature of the city, is the Prado, embellished with fountains and many fine groups of statuary. The royal picture gallery, built in 1785 by Charles III and situated in the Prado, is one of the finest in Europe. It contains over 2,000 paintings, including masterpieces by Velasquez, Murillo, Raphael, Rubens and Van Dyck. Another fine square is the Plaza Mayor, formerly the scene of bullfights. The present bull ring, in the eastern part of the city, dates from 1874 and has a capacity of 12,000 spectators. The opera house is one of the most beautiful in Europe. The National Library, founded by Philip V, contains over 600,000 volumes. Madrid has many schools and churches. The University of Alcala, founded in 1508, is very modern in extent and scope.

Madrid is a consuming rather than a producing center. Its manufactures, excepting tobacco, are of little consequence; almost every article of food and clothing is imported. The publishing trade is important. The old tapestry factory still does beautiful work, and the potteries at Moncola are producing clever imitations of the earthenware for which Spain once was renowned.

Chroniclers trace the existence of Madrid as far back as the tenth century, when it was a fortified post on the frontier of the Moorish kingdom of Toledo. It began to be a place of significance under Charles V. When, in 1561, Philip II made it the capital of Spain, it had a population of 30,000. Population in 1910, 571,539. R.D.M.

Consult Calvert's *Madrid: An Historical Description and Handbook of the Spanish Capital.*

MAELSTROM, *male'strom*, a swift and dangerous tidal current, famed in medieval and modern legends, which flows between two islands

of the Lofoten group, lying off the northwestern coast of Norway. Between the tide level in the ocean and that in the West Fiord, which lies between Lofoten and the mainland, there is a very great difference, and every twelve hours a huge mass of water, moved from the fiord to the ocean and back again, runs with great swiftness through the many narrow island channels. Dangerous currents, therefore, develop, the swiftest being the famous Maelstrom, between the islands of Vaerö and Moskenaesö. This current becomes very dangerous when the wind blows against it between high and low tide; the sea then is whipped into a seething mass that would swallow up any small vessel venturing upon its waters.

Of the many stories woven about this current, none is more graphic than Edgar Allan Poe's *A Descent into the Maelstrom*. He describes it in these words:

> The vast bed of the waters, seamed and scarred into a thousand conflicting channels, burst suddenly into frenzied convulsion—heaving, boiling, hissing—gyrating in gigantic and innumerable vortices, and all whirling and plunging on to the eastward with a rapidity which water never elsewhere assumes, except in precipitous descents.

As a figure of speech the word is found in all modern literatures, and refers to any violent, overpowering force.

MAETERLINCK, *mah'ter lingk,* MAURICE (1864-), a Belgian poet, dramatist, naturalist, idealist and story-teller, the winner of the Nobel Prize for literature in 1911. His dramas, upon which his fame largely rests, include *The Blue Bird, Monna Vanna, Pelléas et Mélisande, The Intruder, The Blind* and *Home.* Though most of his plays are mystical and symbolic, and therefore not well adapted for stage presentation, his *Blue Bird* met with deserved favor when played in the United States. Whether as philosopher, dramatist, poet or essayist; Maeterlinck's subjects concern themselves chiefly with his views of life and death. He is a modern hermit, living with his own dreams. He prefers his bees, of whom he has written so charmingly in *The Life of the Bees,* and his dogs, eulogized in his *Our Friend the Dog,* to the companionship of friends. His wife, Georgette Le Blanc, is a gifted musician.

MAFIA, *mah'fi a,* a secret society in Sicily, more powerful than the Camorra of Naples, which protects its members from punishment for any crime they may commit. There is a higher and a lower Mafia, the latter carrying on the work of blackmail and robberies for the organization, confident that it can rely upon the more influential Mafiosi for protection when involved in difficulty with the authorities. The Mafia controls elections, assists smugglers, directs strikes, and even fixes the hire of workmen. The Italian government's efforts to stamp out the society have not succeeded; however, numbers of its members have been driven from the country, and many of these have organized branches of the Mafia in various cities of the United States, notably in New York and New Orleans, fostering lawlessness and swelling the criminal classes wherever they locate. See CAMORRA.

MAGAZINE, *mag'a zeen,* a military and naval term specifying a protected building or room for the storage of explosives and ammunition. The word is derived from an Arabic word meaning storehouse, and is used as *magasin* in France, meaning a *store* or *shop.* The name is also applied to the chamber of a repeating rifle or machine gun holding a supply of ammunition.

Magazines for explosives and ammunition are generally built underground, or with shell-proof protection. On board ship magazines are placed as far from the engines and fireroom and as far below the water line as possible. They are usually watertight compartments, with walls of steel, lined with asbestos board. In the tropics artificial cooling of the magazine is necessary, and this is accomplished by a ventilating system with pipes to bring cool air from the refrigerator and other pipes for the escape of the hot air. Magazines are also fitted with water pipes by means of which they can be flooded in case of fire. Men working in the magazines wear shoes without nails, and no iron or steel fittings on tools are allowed inside. Ammunition is hoisted through small openings and is taken on small cars to the guns.

Still another use of the word *magazine* is found in its application to a periodical publication bound in book form, usually issued once a month.

MAG'DALEN. See MARY MAGDALEN.

MAGDALEN, *mag'dah len,* ISLANDS, a group of islands, politically under the control of the Canadian government, and forming a part of Gaspé County, Quebec. They are situated near the center of the Gulf of Saint Lawrence, fifty-four miles northwest of Cape Breton and about a hundred miles southwest of Newfoundland. The inhabitants, principally French-Canadians, get their living through the fisheries of the adjacent waters, in which lob-

ster, cod, herring and seal abound. Gypsum is found in large quantities; this and grindstones are the principal exports. Amherst and House Harbor are the leading settlements, the former being a port of entry. Population, about 5,000.

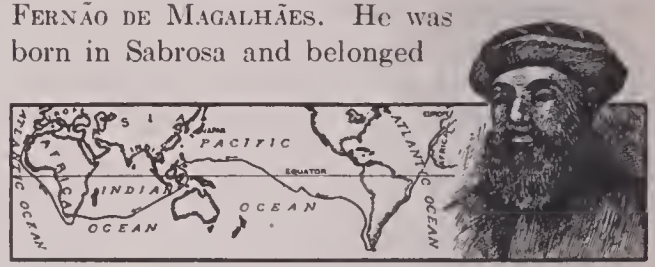
MAGDALENA, *mahg dah la'nah,* **RIVER,** the most important river of Colombia, South America, the main artery of commerce and communication in the republic. It rises in the Andes Mountains, flows northward and discharges through two channels into the Caribbean Sea. The length is about 1,000 miles, and it is navigable for ocean steamers as far as Barranquilla, where it separates into its two channels. Bogota, the capital of Colombia, depends largely upon this river for communication with points on the coast. Heretofore the city has been reached by steamer from Barranquilla to Girardot, thence by rail, the trip consuming about ten days, but a hydroplane invented in 1916 by Senor Mejfa, that can carry mail and ten passengers, will shorten the trip to twenty-four hours.

MAGDEBURG, *mahg'de boorK,* the capital of the province of Saxony, southwest of Berlin, is a first-class modern fortress, as the term was understood prior to 1914, and one of the leading commercial cities of Northern Germany. The town, built mainly on the left bank of the Elbe, is divided from north to south by a wide avenue lined with historic shops and quaint old gabled houses. There are many beautiful churches, the most famous being the Cathedral of Saints Maurice and Catharine, built mainly between 1208 and 1363, but finished in 1521. It is a fine type of Gothic architecture and contains many monuments and tombs, including those of Otho the Great and his wife Editha. There is also the eleventh century Basilica of Our Lady, the Gothic Church of Saint Ulrich, the modern Church of Saint Paul and the synagogue.

Magdeburg's commercial importance is in its great machine shops. It is also the center of the German beet-sugar industry and well known for its fine fruit and vegetables; there are great distilleries, chemical works, manufactories of chicory, chocolate, tobacco, cigars, cement, fertilizers, pottery, ribbons, gloves and musical instruments.

The history of Magdeburg began in 937, when Otho the Great founded a monastery there, which was later made the seat of an archbishop. During the Middle Ages it was an independent city, and its laws, known as the *Magdeburg Right,* were used as a model by many other towns. It became an important commercial city and one of the most powerful members of the Hanseatic League (which see). In 1524 it adopted the Reformed religion and in the religious wars was conquered by Maurice of Saxony and given to Brandenburg. In the Thirty Years' War it suffered much, belonging first to one side, then to another; finally, by the treaty of Westphalia, it was given to Saxony. Population in 1910, 279,629.

MAGELLAN, *ma jel'an,* FERDINAND (about 1470-1521), the name by which the Portuguese navigator was known who first discovered a route around the world. His real name was FERNÃO DE MAGALHÃES. He was born in Sabrosa and belonged



MAGELLAN AND HIS ROUTE

to the nobility of Portugal, but fell into the king's disfavor and offered his services to Spain. After Columbus returned home with the story of his discoveries, the king of Spain believed that by sailing west India could be reached, and he fitted out an expedition of five ships and 270 men to test his views. Magellan had been to India, directed by Da Gama (see GAMA, VASCO DA), and he boldly struck out for what is now known as South America, the ships leaving Seville on September 20, 1519.

He explored the South American coast, then his frightened men rose in mutiny, and one ship turned back, but Magellan declared he would push on southward "if we have to eat the leather of the rigging." Finally he sailed into a channel between the precipices of Cape Horn and after thirty-eight days a splendid open ocean appeared. He named it the Pacific, which meant *peaceful,* for it was smooth and in contrast to the tempestuous "rounding the Horn." After a tedious voyage the Philippine Islands were reached, and here Magellan was killed by the natives, who were angered by his rough treatment of them. Sebastian Del Cano, as lieutenant, then took command, and he returned around the Cape of Good Hope, reaching Spain on September 8, 1522. The expedition had been gone nearly three years.

Strait of Magellan, the narrow and tortuous strait to which Magellan gave his own name after its discovery in 1520. It is 350 miles long,

and varies from two to seventy miles in breadth. It separates the continent of South America from the islands of Tierra del Fuego, meaning *fire,* probably so named from the numerous fires of the natives seen from the ships. See Horn [Cape]; Tierra del Fuego.

Consult Towle's *Magellan, First around the World;* Ober's *Ferdinand Magellan.*

MAGGIORE, Lake, or **LAGO MAGGIORE,** *lah'go mahd jo'ray,* is one of the largest lakes in Italy; its name is an Italian word meaning *greater.* It is surrounded on the north and west by granitic mountains rising 7,000 feet above the sea, and on the south and east by picturesque vineyard-covered hills. Although situated for the most part in Northern Italy, part of the lake lies also in the Swiss canton of Ticino. Several interesting towns and villages have sprung up around its shores, the most important being the flourishing city of Pallanza, with a population of about 5,000. Lake Maggiore, which lies 646 miles above sea level, and in some places is over 1,000 feet deep, is thirty-nine miles in length.

MAGI, *ma'ji,* the name applied to the scholarly priests of ancient Media and Persia, who had official charge of all sacred rites and who interpreted dreams and practiced magic. Originally they worshiped Ahriman, the god of evil, as well as Ormazd, the god of good, but devil-worship was forbidden by Zoroaster, the founder of their faith, and the magi became highly-venerated priests of the reformed faith. The three wise men who came from the East to do homage to the newborn Saviour were magi. Their names were Melchior, Balthasar and Gaspar, and it is claimed that their bones are preserved in the Cathedral of Cologne. The youngest of them is represented in works of art as a Moor. The magi, originally of the highest order, gradually lost caste and in time became ordinary jugglers and fortune tellers.

MAGIC, *maj'ik,* a term which refers to the power to command natural and supernatural forces by the priestly adept; it includes also the mystic lore and practice developed to support the view of the operations of nature from which such power is derived. The conception of the world and its regulation in which magic finds its place is that which prevails among primitive peoples. In simpler cultures magic is religion and philosophy, science and art; it brings man into relation with the powers above him; it protects against evil, foresees the future, prescribes for disease and determines the relations of life.

Magic affiliates with the conception of the world and its happenings, as significant for human fate; omens abound in nature and must be sought in signs. Also it affiliates with the view of the animation of sun, moon, stars, sea, river, grove, wind, rain, lightning, by spirit forces; also with the belief in the survival of ancestral ghosts, and thus the creation of an unseen world peopled with spirits that control human fate. Whether strongly spiritual or leaning to the search for power by control over hidden processes of nature, the magical view surrounds life with constant obligations and dangers; and it is in the prescription and proscription, the securing of good fortune and avoidance of evil, that the magician finds his occupation and magic its systematic elaboration. "Magic is the physics of mankind in a state of nature."

The scope of magical belief and practice is so vast that it requires consideration from many aspects. This is given in the articles in these volumes upon *conjuring, divination, superstition* and *witchcraft* (which see). The present article will be confined to a general survey of its development.

The three most general products of magic are divination, the intercourse with spirits and the control of supernatural (or unusual) forces by a penetration of the secrets of nature. Where magic prevails, it shapes belief generally and prescribes what must be done and not done (taboo) to avoid evil and secure good fortune; and it develops special regulations for the cure of disease, the punishment of enemies, the manner of conducting agriculture, the chase, war and the common affairs of life. In early civilizations these beliefs assume a systematic form. They appear prominently in the practices of the Babylonians, Assyrians and Egyptians; and some trace of this Oriental character persists in the Greco-Roman tradition and in the widespread revival of magic in medieval times under the added influence of Christian doctrine. The Egyptians made much of the good and evil days (astrologically determined) for taking medicine, for letting blood, for sacrifice, for sowing and reaping, for undertaking new enterprises. In *Ezekiel* XXI, 21 it is said of the king of Babylon that "he shuffled arrows, he consulted teraphim; he looked in the liver." The control of unusual power by the priest magician appears in the story of Aaron's staff.

It was in the intercourse with the spirit world —which is typically represented (though in a modern form) in the Faust legend—that the most dreaded power of the magician lay. In

the medieval legend this was the final test of his formulas and incantations, the summoning of the spirits without whose aid he is powerless. Among primitive peoples the belief is a vaguer one in the ability of the enemy by proper ceremonies to bewitch one to death, to spoil crops, to inflict dire disease. This power for evil was known as sorcery (black magic, necromancy); it was prohibited among the Jews (*Leviticus* XX, 27), among the Romans and in English law in the early nineteenth century.

As civilized nations gained a wider acquaintance with the operations of nature, magical practices withdrew to take shelter in special cults, in miscellaneous observances of a folklore type, though never absent from the consciousness of the humbler classes. That the educated classes were exempt from such belief is suggested by Cato's question, whether one diviner could meet another and not laugh; the absurdity of a ragged fortune teller advising others how to gain wealth and accepting a small fee for the advice was as obvious in Roman days as in our own. Magic retains interest for its historical importance as well as for the light which it sheds upon survivals of belief and the origin of customs from which the original meaning has departed or become transformed.

The deposits of magic in the history of thought are many. It appears in the view that learning is a secret and esoteric pursuit, a revelation of mysteries. It surrounds itself with symbols, strange devices, occult operations; it demands years of devoted preparation. Such occupation seems congenial to the Oriental mind; and the prestige of the Orient imparts a similar importance when transferred to the Western world. This factor appears conspicuously in the career of theosophy (which see), a cult that was founded in New York in 1875 and transferred to Madras in 1879; it revived the notion of "mahatmas," or adepts; it performed miracles, such as the transfer of objects through space without contact; and it connected its doings with a mystic view of the nature of being and reincarnation. Though its leader was convicted of gross fraud, the movement continued to thrive. A similar belief in the possession of unusual powers is responsible for the traditions in favor of second sight, for some of the alleged powers of spiritualistic mediums (see SPIRITUALISM), and more remotely for the bias in favor of telepathy (which see). A more practical aspect of the belief appears in the pretension of rain makers and in other wonder-working practices.

Unquestionably the belief in witchcraft in some form is the largest product of magic. Apart from the specific belief in witches (in Christian lands; see WITCHCRAFT), and the general primitive belief in the power of thus inflicting injury by wish and incantation and ceremony (see SUPERSTITION), there is to be included the types of magical cures, treatment by sympathetic magic, the use of fetishes and allied procedures.

Throughout this group runs the magical notion that operation upon something that represents an object will affect the object. The magical idea appears in the Melanesian practice when finding an arrow to place it among cool, moist leaves if it is an arrow that has wounded a friend, but in the hot embers if it is an arrow that has wounded an enemy; in the former case the wound will heal; in the latter case it will be inflamed. Driving nails in a man's footprint will make him go lame, and even the utterance of names will serve (such is the origin of the curse) to carry the disaster to the owner. The converse process underlies cures, the process of which may vary from the treatment of the weapon that made the wound to the exorcism of spirits that caused disease. The fetish is an object to which special significance is attached and which serves to protect from such magical injury as well as to cure by its peculiar power. Material aids may be used, such as the medieval love philters which would compel attraction, while the special pursuits of alchemy and customs associated with it form systematic examples of magical procedure.

Magic when viewed in its relation to religion reflects the conception of the spirit forces from which the power was derived, and from this aspect develops its relation to ghosts, its notions of bewitchment, exorcism and certain phases of divination. In its relation to science it develops the more complex systems of divination by the penetration of the secrets of signs of things; it develops practices of cure and control through insight into hidden forces and an influence upon their operation. In this pursuit appear the use of symbol and correspondence, of the relations of one world (the celestial) with another (the terrestrial) and a third (the spiritual), which constitutes the course of its inquiry. Its aim tends to ambitious and comprehensive projects like the "philosopher's stone." While in our own day the objective view of natural phenomena prevails, tendencies to belief in supernatural powers persist, though

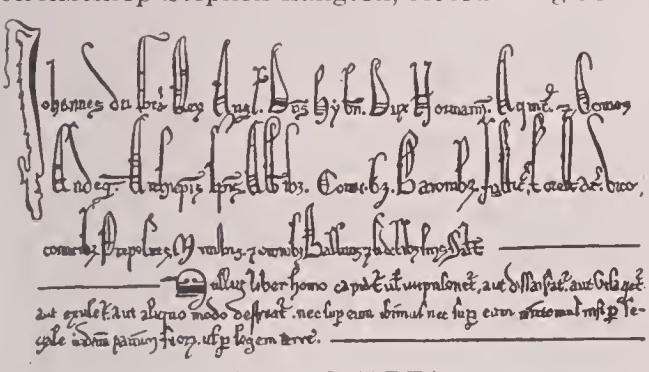
in more enlightened form, while cruder tendencies of the same nature appear in current superstitions and the stray adherence to practices of primitive magic (Voodoo) among the negroes, or to outgrown systems of divination (palmistry and the like) which attract attention by inconsistency with the scientific habit of mind that has displaced them. J.J.

Relating to Various Beliefs. The articles on the following topics, while all do not bear on magic, may be of interest:

Alchemy	Palmistry
Astrology	Phrenology
Clairvoyance	Physiognomy
Conjuring	Psychical Research
Demonology	Psycho-Analysis
Divination	Spiritualism
Faith Cure	Suggestion
Hypnotism	Superstition
Medium	Telepathy
Mesmerism	Theosophy
Mind Reading	Trance
Necromancy	Witchcraft
Occult	

MAGIC LANTERN. See STEREOPTICON.

MAGNA CHARTA, *mag'na kahr'ta,* or **GREAT CHARTER,** a document, often called "the corner stone of English liberty," to which the English barons, under the leadership of Archbishop Stephen Langton, forced King John



MAGNA CHARTA
Facsimile of six lines of the historic document.

to affix his royal seal in 1215. Of this memorable document the historian Myers says:

> Considering the far-reaching consequences that resulted from the granting of the *Magna Charta* —the securing of constitutional liberty as an inheritance for the English-speaking race in all parts of the world—it must always be considered the most important concession that a freedom-loving people ever wrung from a tyrannical sovereign.

The utter disregard and tyranny with which John ruled his subjects in time aroused the entire country, and a council was held in 1213 at Saint Albans, near London, composed of representatives from all parts of the kingdom. Plans were made to meet a few weeks later at Saint Paul's, in London, where for the first time in the history of the nation the interests of all classes were protected in a new charter, modeled after an earlier one granted by Henry I.

As a result of this movement a conference with the king was arranged for in the meadow called Runnimede, on the banks of the River Thames. There, on June 15, 1215, John, much against his will, was forced to do as the barons ordered. After he had put his seal to the document he tried to break its rules, but the barons had guarded against such a danger by appointing twenty-five of their number to compel the king to keep his agreement. This appointment was included in the sixty-three articles of the Magna Charta, most of which, owing to changes wrought by time, have lost their original importance. Three of these articles, however, are of enduring value. These provide (1) that justice shall not be sold or denied; (2) that no man shall be deprived of his liberty or property except upon the judgment of his equals or the law of the land; and (3) that no taxes, except the customary feudal dues, can be levied by anyone without the consent of the national council. The second of these provisions is the basis of the writ of habeas corpus.

The Magna Charta was confirmed thirty-seven times by later kings. Copies of the charter, now a shriveled parchment in the British Museum, were made and distributed about England. M.R.T.

Consult McKechnie's *Magna Carta: A Commentary on the Great Charter of King John:* Barrington's *Magna Charta and Other Great Charters of England.*

Related Subjects. The reader is referred to the following articles in these volumes:

England, subtitle *History*	John (England)
Habeas Corpus	Runnimede

MAGNESIA, *mag ne'zhe ah,* a white, tasteless, earthy substance, used to some extent in families as a mild remedy for an excess of acid in the stomach and as a mild cathartic. In commerce it is employed in obtaining metals from their ores and in making crucibles. It is a compound of magnesium and oxygen. Mixed with water to the thickness of cream it is often sold as *milk of magnesia.* It is manufactured in large quantities from magnesium chloride.

MAGNESIAN LIMESTONE. See DOLOMITE.

MAGNESIUM, *mag ne'zhe um,* a very light, grayish-white metal, which burns with a brilliant white light. It can be drawn into wire and rolled into ribbon. Powdered magnesium

when blown through an alcohol or gas flame makes a brilliant white light. Mixed with potassium chlorate, magnesium powder is often used for a flash light in photography. The pure metal is of but little value except for its brilliant light, and probably not over twenty tons of it are manufactured annually. A small quantity is used in making alloys, of which *magnalium* (ninety-eight per cent aluminum) is the most useful. Among the important compounds of magnesium are the oxide, *magnesia,* or *calcined magnesia (magnesia usta),* a very infusible, or "refractory," substance used in lining electric furnaces; the carbonate, which occurs naturally as *magnesite;* the basic carbonate, *magnesia alba,* used in tooth powders and silver polishes and in medicine; and the sulphate, Epsom salts (which see). The *chloride* is used for obtaining the pure metal, which is separated from it by electricity.

Magnesium is widely distributed, occurring in asbestos, carnallite, dolomite, hornblende, magnesite, serpentine, soapstone, tourmaline, meerschaum and a few other minerals. J.F.S.

MAGNET AND MAGNETISM. Magnetism is the power possessed by a certain variety of iron ore and by artificial magnets which enables them to attract iron and steel.

Magnets. Many boys have among their possessions small u-shaped magnets like the one shown in Fig. 1, and with this magnet many interesting experiments may be performed. If the magnet is large it may lift a hammer, a

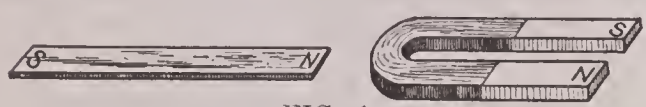


FIG. 1

wrench or other objects of equal weight. A small magnet will lift nails, tacks and iron filings.

With a bar magnet, which is a straight piece of magnetized steel, other interesting experiments may be tried. Place a piece of glass or paper over this magnet and sift iron filings on it, then tap the glass or paper lightly. The filings will arrange themselves in curves around each end of the magnet (Fig. 2). This is one way of showing that the magnetic force is strongest at the ends of the magnet and that it decreases towards the middle of the bar, where it seems to disappear. This is also true of the u-shaped magnet, which is a bar magnet bent into the shape of a *u,* or horseshoe.

The ends of a magnet are called the *poles.* When a bar magnet is suspended in a horizontal position so that it can move freely it comes to rest pointing nearly north and south, and the same end always points north. The magnetic needle is a small bar magnet so mounted that it is free to move on a pivot, and it points practically north and south.

The end of the magnet which points north is called the *north pole,* and is marked by *N* or +. The end pointing south is called the *south pole,* and is marked *S* or —. If we bring the north pole of a magnet near the north pole of a magnetic needle, the north end of the needle turns away from the magnet, but if we present the south pole of the magnet, the north pole of the needle turns towards it. From this and a number of other experiments the law of the poles was discovered. It is this: *Like poles repel, and unlike poles attract, each other.*

How to Make a Magnet. When a piece of iron or steel is brought in contact with a magnet it becomes *magnetized.* Stick a nail endwise on your magnet. You can stick a smaller nail to the other end of the first and a tack to the further end of the second, and the tack will pick up iron filings. Take the first nail from the magnet and the others drop from it and from each other. However,

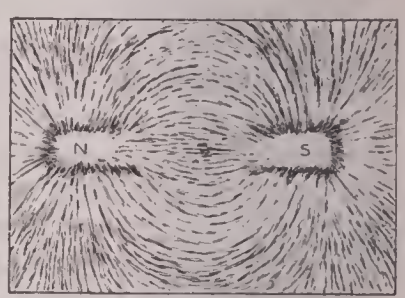


FIG. 2

were a piece of hard steel used instead of the nail it would have retained its magnetism for some time after the magnet was removed. On the other hand, it would have been magnetized much more slowly than the nail. We have learned by repeated experiments that hard steel magnetizes slowly but retains its magnetism a long time, and that soft iron is magnetized quickly but loses its magnetism instantly when contact with the magnet is broken. Rub your knife blade over a magnet from the middle towards the end, carrying it back through the air, and in a short time it will become magnetized. You may also magnetize it by letting it lie on the magnet for several hours. A knife thus treated will pick up needles, tacks and sometimes small nails. Any piece of steel can be magnetized in the same way. One peculiarity of a magnet is that it never loses any of its power through magnetizing other objects. A current of electricity passing through an insulated wire wound about a piece of soft iron will magnetize the iron. See ELECTROMAGNET.

Magnetic Induction. If the nail above referred to is held within a small fraction of an inch of the magnet it will become magnetized, though not as strongly as by actual contact. Large bodies of iron affect the working of a magnetic needle, even when some distance from it; every compass on a ship has to be adjusted so as to counteract the influence of the iron and steel in the ship's framework. This influence is called *magnetic induction,* and the space within which a magnet influences another body is known as the *magnetic field.*

The Earth a Magnet. Many experiments have been made to test the magnetism of the earth. Scientists discovered many centuries ago that the magnetic needle points nearly north and south because the earth is a great magnet, with poles like other magnets. These are called *magnetic poles,* but they are not located at the geographic poles, the north magnetic pole being in Boothia Peninsula, north of Hudson Bay, and the south magnetic pole lying almost directly south of Sydney, Australia, and about 1,800 miles from the South Pole.

Because of the location of the magnetic poles the magnetic needle points directly north and south in only a few places, and the difference between its direction and due north is known as *magnetic declination* or *variation.* A line that passes through places where the needle points due north is called a *line of no variation.* One of these lines passes through the United States, entering the country on the Atlantic coast about fifty miles south of Charleston, S. C., and passing northward through South Carolina, North Carolina, Tennessee, Kentucky, Ohio and Michigan and crossing the east end of Lake Superior. According to the law of poles the so-called north pole of a magnet is the north-seeking pole, or in reality the south pole, and the so-called south pole is the south-seeking pole.

History. Magnetism was discovered many centuries ago in a variety of iron ore found near Magnesia, Asia Minor, hence its name. Pieces of this ore were found to attract iron, and the name *lodestone* was applied to them. A lodestone is a natural magnet, and is something of a curiosity because lodestones are seldom found. Magnetic iron ore in which the lodestone is found is widely distributed over the earth, but its magnetic power is very seldom strong enough to be detected. C.R.M.

Consult Jeans' *Mathematical Theory of Electricity and Magnetism;* Jansky's *Elementary Magnetism and Electricity.*

Related Subjects. The reader is referred in this connection to the following articles in these volumes:

Compass	Magnetite
Electromagnet	Magneto-Electric
Electromagnetism	Machine
Magnetic Needle	

MAGNET'IC NEEDLE, a thin, slender bar magnet suspended by a thread or mounted on a hard, almost frictionless needle-point, so adjusted that it is free to swing in any direction in which it is influenced. When no magnetic body is near it points approximately north and south, that is, to the north and south magnetic poles. See COMPASS; MAGNET AND MAGNETISM.

MAG'NETITE. Some sand contains small grains of a jet black color, commonly called *black sand.* When a magnet is thrust into the sand, the black grains stick to it and are separated from the sand when the magnet is withdrawn. These black grains are *magnetic iron ore,* or *magnetite.* Magnetite is found in large masses as well as in sand. Such masses occur at the Cornwall mines in Pennsylvania, in the Adirondack Mountains and in Sweden. It always has this black, glossy appearance and is very hard. Magnetite is one of the most valuable ores of iron, for in addition to other ores it greatly improves the quality of the metal produced.

MAG'NETO-ELECTRIC MACHINE, a device in which a magnet is used to generate an electric current. The machine consists of a powerful horseshoe magnet, in front of which a pair of coils, called an *armature,* is caused to rotate (see MAGNET AND MAGNETISM). The armature contains a core of soft iron, which acquires and loses magnetism as it draws near to, and then recedes from, one of the poles of the magnet. These changes of magnetic strength set up alternating currents in the armature. Their force depends upon the strength of the magnet and the speed with which they are rotated. In 1866 an inventor discovered that if the current be passed through the coil of an electromagnet, the force it produces is far greater than when the permanent magnet is employed. By causing a still larger armature to rotate in front of the electromagnet, the inventor was able to increase the force of the current still further. The industrial importance of this discovery was very great, for it led to the construction of powerful machines in which the fixed magnets were electromagnets. Such machines are called *dynamos.* Driven by steam, they generate the electric currents that light the streets of cities and furnish power for

street cars, elevators and the like. See Dynamo; Electricity.

MAGNIFICAT, *mag nif'i kat,* the title given to the Latin text and translation of the song of the Virgin Mary. It is the opening word in the Latin *Vulgate*, "Magnificat anima mea Dominum" ("My soul doth magnify the Lord"). It is sung in the Roman Catholic Church at vespers, or evensong, and in some churches is sung at other devotions. It is said that this canticle or song has been set to music oftener than any other hymn in the liturgy.

MAG'NITUDE, in astronomy, is a term used to express the relative brightness of a star. The ancients, to whom the telescope was unknown, distinguished stars of six degrees of brightness. The modern astronomer still calculates magnitude on a scale ranging from the sixteen stars of the greatest brightness, called first magnitude, to the faintest stars visible to the naked eye, called sixth magnitude. In this scale the quantity of light given by any star is taken to be 2.512 times brighter than that of a star of the next lowest degree of brightness. Sirius and Arcturus, each of which is described under its title, are examples of first-magnitude stars. See Astronomy; Stars.

MAGNOLIA, *mag no'li a,* the name of a tree, or more truly a shrub, with gloomy, blue-green foliage and fragrant, ivory-colored blossoms, named after Pierre Magnol, a French botanist. In some of the warmer countries in the north of Europe a certain species was sometimes called the *beaver tree,* because the beavers used the roots for food and made their houses from the soft wood of the trunk. The magnolia is known by various other names, among them, *sweet-bay, swamp sassafras* and *white laurel.* This shrub, which often grows as tall as a tree, is found in swampy woods in the Atlantic and Gulf States in America, and in parts of Europe, Greenland, Australia, Japan and Java. Because of its beauty the year round it is frequently transplanted to parks and gardens. The leaves are evergreen and the fruit is spike shaped and contains many seed vessels, from which scarlet or brown seeds hang by slender threads. As the flowers grow older they turn from deep cream to a rich peach color. The bark and dried flower buds of the plant are used medicinally. The magnolia is the state flower of Mississippi, Louisiana and Georgia.

Fragrant o'er all the western groves,
The tall magnolia towers unshaded.
—Maria Brooks.

MA'GOG, a town in Stanstead County, Quebec, in the southeast corner of the province. It is situated at the north end of Lake Memphremagog, which is navigated by steamers plying between towns in Quebec and Vermont. Magog is also on the Halifax-Montreal short line of the Canadian Pacific Railway, being seventeen miles west of Sherbrooke and eighty-eight miles east of Montreal. The town is a popular resort for anglers, and is also known for its butter and cheese, its textiles, and its lumber products. Population in 1911, 3,978.

MAG'PIE, a bird of pleasing appearance, somewhat similar to the crow and the jay, found in Western North America, from Mexico

THE MAGPIE

to Alaska. It is a glossy black in color, with under parts and wing coverts of pure white, and it has a very long, graduated tail. Magpies are usually seen in groups, and are noisy and quarrelsome, delighting in thieving and mimicry. When tamed, they may be taught to speak simple syllables. They build a bulky, domed nest with an opening in the side, usually placed in the fork of a low tree. The eggs are from four to eight in number, grayish white in color, spotted with brown and drab. Species of the magpie are also found in Europe and Asia, where by superstitious people the continued presence of one near the home is considered an ill omen.

MAGYARS, *mod'yahrs,* the name which the upper classes in Hungary prefer to their more familiar one, Hungarians. A little more than 1,000 years ago hordes of Magyars, reckless and skilled barbarian horsemen, plunged into Europe from their home somewhere east of the

Carpathian Mountains. These wild pagan people spread terror throughout Europe, destroyed the state of Moravia (which see) and harassed Germany and Italy until they were eventually forced back into the country now known as Hungary. There, in spite of many lapses into barbarity and internal strife, they adopted Christianity and practically all the important institutions of civilization. They are imperious and proud and impatient of restraint. In dress they love the most vivid colors and striking combinations. They number over 8,000,000.

The Magyars were for years a dependent people of the old Austrian Empire, a condition which they bitterly resented. Finally their demand for self-government became too strong to be disregarded, and in 1867 Hungary was made a constitutional kingdom in the dual Austro-Hungarian Monarchy (see AUSTRIA-HUNGARY, subhead *History*). Though relations between Austria and Hungary have not been kept on a very friendly basis, the Magyars gave their loyal support to the central empires in the War of the Nations.

MAHABHARATA, *ma hah bah' ra ta,* meaning literally "the great history of the descendants of Bharata," is the name of one of the two great epic poems of ancient India, the other being the *Ramáyana* (which see). The complete work consists of 110,000 couplets, its contents being nearly eight times the bulk of the *Iliad* and *Odyssey* combined. It is divided into eighteen books and primarily narrates the history of the war between the Kauravas and the Pandavas for the possession of the ancient kingdom of Bharata. The matter incidentally linked with the main thread of the story relates to the mythological history as well as the laws, religion, morals and philosophy of India. Through the incidental matter the *Mahabharata* became a veritable encyclopedia of India. The authorship of the epic is attributed to Vyasa "the stranger," but this simply means that the contents were welded together with a certain order and sequence so as to form one work. That this poem was not the work of one man but a production of successive ages is evidenced by the diversity of material and the differences in style.

MAHAN, *ma hahn',* ALFRED THAYER (1840-1914), an American naval officer and author, considered one of the greatest authorities in the world on the sea-power of the nations, was born in West Point, N. Y. His father was a professor in the United States Military Academy, and an author of notable books on military engineering. The son Alfred was educated in the Naval Academy, graduating in 1859, and entering the navy as a midshipman.

In 1861 he was promoted to be lieutenant, and during the War of Secession served in the South Atlantic and Gulf squadrons. Mahan was on duty at the Naval Academy during the years of 1862-1863, and attained the rank of lieutenant-commander in 1865, receiving his commission as commander in 1872, and that of captain in 1885. He was twice elected to the presidency of the Naval War College at Newport (in 1886 and in 1892). In 1896 he asked permission to retire from active service; but on the outbreak of the Spanish-American War accepted office on the naval board, and later was one of the delegates of the United States in the Peace Conference at The Hague.

In 1894 Mahan received from Oxford the degree of D. C. L., and from Cambridge that of LL. D. He also was honored with the latter degree by Harvard, Yale, McGill University (Montreal), and by Columbia University (New York). He is the author of many valuable books, his greatest, *The Influence of Sea Power on History, 1660-1783,* being considered one of the world's most important contributions to naval literature, and reputed to have been the inspiration of Emperor William of Germany in the construction of that country's formidable navy. His *Life of Nelson* is held by many to be the best ever published. Other works are *Life of Farragut, Lessons of the War with Spain, Armaments and Arbitration, War in South Africa* and *Problems of Asia.*

MAHANOY, *mah ha noi',* CITY, PA., is a borough in Schuylkill County, in the anthracite coal fields of the east-central part of the state. It is on Mahanoy Creek and on the Philadelphia & Reading and the Lehigh Valley railroads, fifty-five miles northeast of Harrisburg and fifty-one miles northwest of Reading. The population is fifty per cent American and fifty per cent foreign, including English and Welsh, Irish, Polish and Austrians. The population in 1910 was 15,936; in 1916 it was 17,463 (Federal estimate).

Coal mining and shipping are the important industries. Ten coal mines in the vicinity employ 8,000 men. There are also potteries, shirt factories and lumber, flour and hosiery mills.

The city was named in honor of an Indian tribe; it was settled in 1859 and chartered as a borough in 1863.

MAHDI, *mah' de,* an Arabian word meaning *the guided one,* is in the Mohammedan religion

the name given to the expected Messiah, or messenger of Allah (God), who is depended upon to complete the prophet's work by destroying unbelievers and dividing this world's goods equally among the faithful. According to tradition, Mohammed foretold the coming of the Mahdi, although this is not mentioned in the *Koran.* Many so-called Mahdis have appeared from time to time in Persia, Turkey, Syria and Egypt. The story of one of these is told in Thomas Moore's *Lalla Rookh.* The latest and best-known Mahdi was Mar Mullah, who led an insurrection in the Egyptian Sudan in 1883. After winning several victories from the English, he occupied Khartum, in the defense of which General Gordon was killed. Although the Mahdi died of smallpox in 1885, it was thirteen years before the British recovered possession of Khartum. See GORDON, CHARLES GEORGE.

MAHMUD II, *mah mood'* (1785-1839), a progressive and broad-minded Turkish sultan, to whose radical reforms, both in the government and army, the present Turkish Empire practically owes what modern elements it possesses. Following the deposition of his brother, Mustapha IV, in 1808, he was raised to the throne and immediately began to reorganize the army. A conflict with Russia, which completely prostrated Turkey, hindered his reform plans for several years, but after the peace of 1812 he entered earnestly into the work. In 1826 Mahmud succeeded in destroying the Janizaries, a Turkish army corps which had strongly opposed the military reform, so the army was reorganized on the European model. In 1821 Greece revolted and six years later secured its independence at the Battle of Navarino, although it was not recognized as a separate kingdom by Turkey until 1829, when this recognition was made a part of the Treaty of Adrianople (see GREECE, subtitle *History*).

MAHOGANY, *ma hog'a ni,* a tree of tropical and semitropical regions, producing a heavy wood which is very valuable for cabinetmaking. The timber is light red when felled, but it darkens on exposure to light and air. It is close-grained and difficult to split, polishes readily to a satiny luster, is superior to almost all others in its freedom from shrinking or warping, in holding firmly to glue and in resisting the action of fire. Varieties with irregular grain or wavy figure are most valued for furniture making. The tree is known to botanists as *Swietenia mahagoni* and is found in Mexico, Central America and various West Indian islands.

Little of the true mahogany is now available, that coming from Central America, called Honduras or Panama mahogany, being the wood of species of *Cedrela,* a genus of trees closely related to true mahogany. This wood is softer, lighter and more brittle, but otherwise closely resembles the genuine article. Other substitutes are from African, Australian and Philippine trees, closely allied with the more valuable woods of the American continent. The fineness and beauty of the grain in mahogany are dependent upon the relative rapidity of growth of the tree; the slower the growth, the finer the grain. Trees attain an average height of about sixty feet, with diameters ranging from three to four feet, although heights of one hundred feet have been noted, with diameters as great as six feet.

The mahogany has been an important tree for centuries. The Aztecs crushed the seeds and used the oil for a cosmetic. Its value as timber was first discovered in 1595, when Sir Walter Raleigh's ship returned to England with repairs made from this wood, but it was more than a hundred years later before it came into general use for furniture and cabinetmaking.

Mahogany is one of the most expensive woods used in manufactures; plain mahogany sells for from sixty to one hundred dollars per thousand feet in the log, and unusually fine logs of mahogany have been sold at prices ranging from seven to ten thousand dollars for the entire log. Added to this cost is the cost of transportation and sawing, which often is great. The scarcity of mahogany and the increasing demand for it has led furniture makers to veneer cheaper woods with very thin layers of mahogany. The process is practical and in every way satisfactory, giving the article so treated the appearance of solid mahogany, without decreasing wearing qualities. E.D.F.

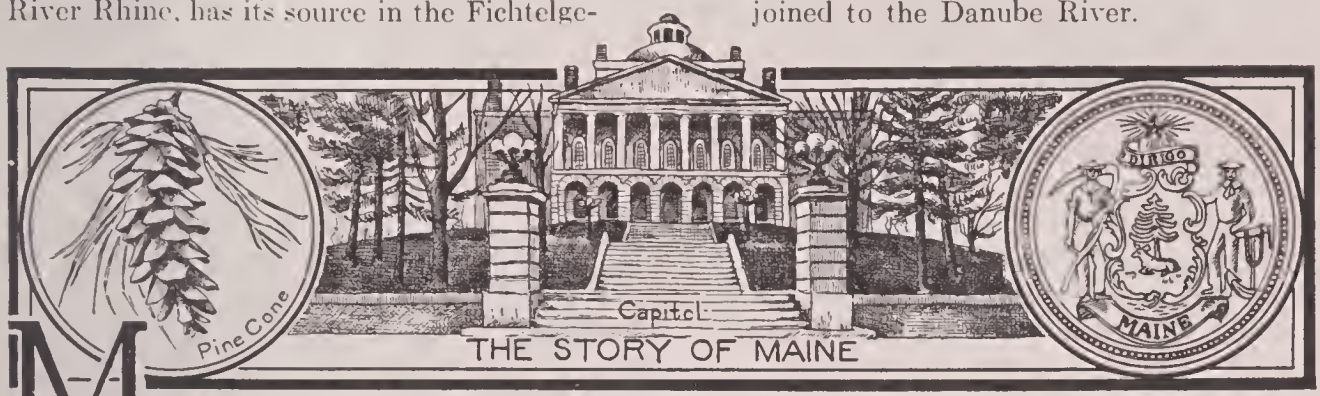
MAHOM'ET. See MOHAMMED.

MAHRATTAS, *ma rah'taz,* a vigorous people inhabiting the central part of India south of the Ganges River, representing a mixed Hindu race. They are divided into two great classes: Brahmans, a high type intellectually and physically; and the low-caste people, plain of feature and short of stature, and possessed of remarkable physical endurance. The Mahrattas are devoted adherents of the Hindu religion, Brahmanism, and they speak a language known as *Marathi.* They are supposed to have invaded India about the tenth century, and by the eighteenth century they had established five

native states. Later their power was broken by the British, to whom they now owe allegiance. They number over 18,000,000.

MAIDENHAIR, *ma'den hair,* a class of ferns whose graceful and delicate fronds make a beautiful covering of green on damp rocks and crumbling walls. The plant is so called from the delicacy of its stalks. It is widely distributed in temperate and tropical regions. From the sweet, fragrant rootstock of the maidenhair of North America is made a syrup called capillaire. Several species are popular ferns in hothouses. See FERNS.

MAIN, the largest eastern tributary of the River Rhine, has its source in the Fichtelgebirge, a mountain range in Northern Bavaria. The stream angles like the letter *S* twice repeated, until it empties into the Rhine near the city of Mainz. It has a total length of 307 miles, and under favorable conditions is navigable to the point where it joins the Regnitz River, 205 miles from its mouth. Its winding course, however, and its numerous shoals, greatly lessen its commercial value, and during dry seasons it is used only by barges, small boats and lumber rafts. Between Mainz and Frankfort it has been converted into a canal on which vessels having a capacity of 1,000 tons may sail. By means of the Ludwig Canal it is joined to the Danube River.



MAINE, *mane,* the most northeasterly state of the American Union, the largest of the New England group. It is popularly known as the PINE TREE STATE, because of the great evergreen forests which cover over three-fourths of its area. As its flower, Maine has appropriately chosen the pine cone. Although it is the youngest of the Atlantic coast states, having been a part of Massachusetts until 1820, within its present limits were one of the earliest colonies and the first incorporated town of America.

Size and Location. Lying adjacent to the Canadian provinces of Quebec on the northwest and New Brunswick on the northeast and east, and having the Atlantic Ocean for its southern boundary, Maine touches only one of the states of the Union—New Hampshire—on the west. The state, over 300 miles long and 185 miles wide, is in shape an irregular quadrilateral. It is nearly as large as the other five New England states combined, and is one and one-half times the size of Nova Scotia. With an area of 33,040 square miles, of which 3,145 square miles are water, Maine ranks thirty-eighth among the states in size, and fifth in extent of water surface.

Its People. The population of Maine is mixed, the foreign-born inhabitants, chiefly French and English Canadians, numbering 110,562, or about one-seventh of the total population of 742,371 (in 1910). Since the admission of Maine as a state, the number of its inhabitants has increased about two and one-half times; from 1900 to 1910 the increase was 6.1 per cent, the population averaging 24.8 per square mile. January 1, 1917, the number of inhabitants was estimated at 774,914. This increase has been due largely to the immigration of aliens. In 1915, 4401 immigrants from Europe reported Maine as their destination.

The early settlers of Maine were of good English stock, and their descendants and those of colonists of neighboring New England states form the larger part of the present population. In the northern section of the state there is a strong French element, chiefly of Acadian stock. A colony of Swedes settled in the northeast in 1870, and a large settlement of Germans was made at Waldboro during the early colonization of Maine. Several hundred Indians, remnants of the Penobscot, Wawenock and Passamaquoddy tribes, the original inhabitants of Maine, still make their home in the state. They are civilized, are occupied in farming and in making Indian souvenirs, and are also employed as guides to hunters and tourists. The number of rural and urban inhabitants is about equal, there being about fifty-six per cent of the population living in towns. Portland,

with a population of 62,161, is the largest city and principal seaport; Lewiston, Bangor, Biddeford, Auburn, Bath, Augusta, the capital, Waterville and Sanford are other important towns. Each is described in these volumes.

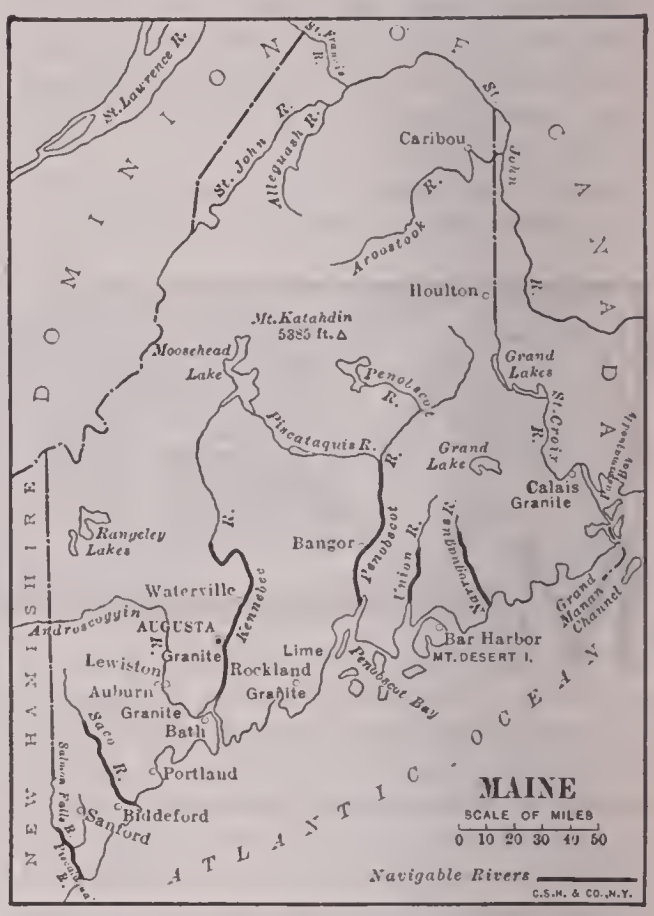
Largely owing to the proximity of the old French provinces of Canada, the number of Roman Catholics in Maine is greater than the total number of Protestants; among the latter the Baptists are most numerous. The Congregationalists, Methodists and Episcopalians are other prominent denominations.

Education. There have been many changes in the school system of Maine. In 1800, while still a part of Massachusetts, the district system was established. The first school law of the state was passed in 1821, and in 1846 a state board of education was created. This board was superseded in 1852 by county commissioners of education, appointed by the governor, and two years later the system was again changed and a state superintendent was appointed. County supervisors were again tried in 1869, but since 1872 the town system of common schools has been in effect, the town superintendent and board of education being under the direction of the state superintendent, who is appointed by the governor. Education, free to all from five to twenty-one years of age, in 1901 was made compulsory.

Normal schools have been established at Farmington, Castine, Gorham, Presque Isle and Fort Kent. The Madwaska Training School is located at Fort Kent. The University of Maine, near Orono, was founded in 1868 as the State College of Agriculture and Mechanical Arts, but in 1897 was given its present name (see MAINE, UNIVERSITY OF). Bowdoin College, at Brunswick, established in 1794, famous as the *alma mater* of Longfellow and Hawthorne and others of New England's great men; Bates College at Lewiston and Colby College at Waterville are prominent institutions of higher education.

Although educational advantages have long existed in Maine the illiteracy is 4.1 per cent, owing largely to the sparsely-settled French portion of the state. The illiteracy among native whites in Maine in 1910 was only 2.4 per cent.

The Land. The rolling state of Maine, with its hundreds of forest-bordered lakes, its turbulent rivers and its sea coast fringed with deep fiords and harbors, and bordered with hundreds of islands, is one of the most beautiful sections of Eastern America. The interior is generally hilly. A continuation of the Appalachians, in the form of a plateau, entering the state on the west at an elevation of 2,000 feet, crosses Maine in a northeasterly direction, gradually dropping to an elevation of 600 feet at its eastern end. A range of hills rises northward from the coast, and another extends from east to west toward the interior. The land slopes in



OUTLINE MAP OF MAINE

Showing the boundaries, navigable rivers, principal cities, mineral deposits, largest lakes and the highest point of land in the state.

the north to the Saint John River and in the south to the coast. The mountains of Maine are not high, and consist largely of isolated peaks. Mount Katahdin, in the central part of the state, the heart of the Moose country, has an elevation of 5,385 feet; Mount Abraham in the west, Mount Kineo, rising abruptly above Moosehead Lake; Mount Bigelow and Mount Blue, are other high peaks whose wooded regions and swift streams are famous hunting and fishing grounds.

Lakes and Rivers. There are more than 1,600 lakes in Maine; these are rock basins scoured out by the glaciers that once covered the state (see GLACIAL PERIOD). Most of these lakes are in the elevated plateau region. Moosehead Lake, the largest, has an area of 120 square miles and is the greatest inland body of water in New England. Rangeley Lakes, ninety

square miles in area, the source of the Androscoggin River; Chamberlin Lake, from which flows the Saint John, and Chesuncook Lake, the water head of the Penobscot, are among the largest.

The rivers of Maine are swift, and most of them flow to the sea in a series of rapids and cascades, which have developed the water power that has built up the manufacturing interests of the state. The largest of the rivers are the Kennebec, rising in Moosehead Lake, the Penobscot, draining one-third of the whole state,

LAKES AND RIVERS OF MAINE

Not all the lakes are shown on the map; there are more than an equal number of smaller bodies of water.

the Androscoggin, the Saco, the Saint Croix on the eastern boundary and the Saint John on the north. The rivers flow through broad valleys and drain numerous lakes which form great reservoirs, making the water supply uniform throughout the year.

The Coast. Most remarkable of all the surface features of Maine is the indented coast, frayed and torn by the sea and by glacial action into a ragged fringe of promontories, and cut by deep fiords and harbors rivaling those of Norway and Alaska. When measured in a straight line, the coast of Maine extends 225 miles, but the actual shore line around the bays and promontories of "hundred-harbored Maine" covers over 2,500 miles. West of the Kennebec, for several miles inland, the coast is flat and marshy, but at Mount Agamenticus, Camden Hills and Mount Desert it rises to bold cliffs.

Maine's excellent harbors are protected from winds by a chain of more than three hundred islands, some low and wooded, others bold and rocky, but they suffer from the great tides which increase northward from Portland, where the rise is eleven feet. Between Eastport and Portland there are proportionally the greatest number of good harbors found anywhere along the United States coast. Some's Sound is the largest and is one of the most advantageous positions on the Atlantic coast for a United States naval station. Other fine harbors are Casco, Penobscot, Frenchman's, Machias and Passamaquoddy bays.

Climate. Because of the arctic currents whose southern reaches touch the shores of Maine, its climate is colder than that of many other places of the same latitude. The winters are severe, the average winter temperature at Eastport and Augusta being 20° F., while at Mount Katahdin the temperature drops to 30° below zero.

The summers are always cool, the average temperature in July being 65° to 70° F., and sudden changes, due to the alternate land and sea winds, occur frequently. The growing season in the southern part of the state is less than six months, and that of the northern section is a month shorter. The rainfall is distributed evenly throughout the year, the average being forty inches; the snowfall on the coast is over sixty inches and in the north 110 inches.

The climate is very healthful, and though damp, is free from malaria. The cool summers, the beautiful seashore, the forests abounding in game and the lakes well stocked with fish have made Maine very popular as a summer resort. Bar Harbor, on the east end of Mount Desert Island; Long Island, Orr's and other islands in Casco Bay, Rangeley and Moosehead lakes and Mount Katahdin are among the most famous summer resorts of the continent.

Agriculture. In the greater part of the state, the sandy soil strewn with gravel and other glacial deposits is unsuitable for agriculture. Aroostook County, in the northern part of the state, the largest district of fertile farm land in New England, is a notable exception. Its potato crop of 17,500,000 bushels reported in the Census of 1910 was three times that of its

nearest competitor, Weld County, Colorado, and exceeded the crop of all but six entire states. Aroostook County furnishes over half the potatoes of Maine, which is always one of the leading states in the production of this vegetable, yet Penobscot County, with a yield of 3,000,000 bushels, was found by the Census to be fifth among all the counties of the Union.

Fertile sections border the rivers, and although the cultivated farm land has decreased since 1880, there are nearly two and a half million acres of improved land in the state. The chief crop is hay, of which over 1,000,000 tons are produced annually. Potatoes constitute the only other field crop of importance. Apples abound throughout the state, and other fruits are grown, though not extensively. In the counties of York, Oxford, Cumberland, Androscoggin, Kennebec and Penobscot there are many dairy farms, and dairying is the most important branch of the stock-raising industry, though many cattle and horses are marketed.

The state is encouraging agriculture, and in 1914, at the cost of $23,000, acquired an experiment station farm in Aroostook County.

Forests. Although Maine is not among the leading states of the Union in the extent of timber land and the value of forest productions, the soil, unsuitable for agriculture, and the even rainfall have made forestry a very important industry, especially in connection with paper making. Forests, chiefly of pine and spruce, cover seventy-nine per cent of the total area of the state. The virgin growth of pine was long ago exhausted, but the land reforests rapidly, and the second growth is now being used. The spruce forests are the most extensive, and at present furnish the largest part of the timber production. The best spruce is found in the Penobscot valley, and large quantities grow in the northern section drained by the Saint John River. A belt of white birch stretches across the state and furnishes an enormous production of spool timber, much of which is shipped to Scotland, the value of the output per year being over $1,000,000. Poplar forests border the Kennebec, cedar grows in the Saint John and Penobscot valleys, and maple is also found in large quantities. The annnal income from forest products in Maine is over $50,000,000.

To avoid the rapid deforestation of the land, Maine makes a yearly appropriation of $73,000 for the maintenance of state forests. This appropriation is surpassed in only five states of the Union. Advice concerning forest management is given by the state, which also, with the coöperation of the Federal government, protects forests against fire. A timber-land tax supports forest fire service in the unorganized townships.

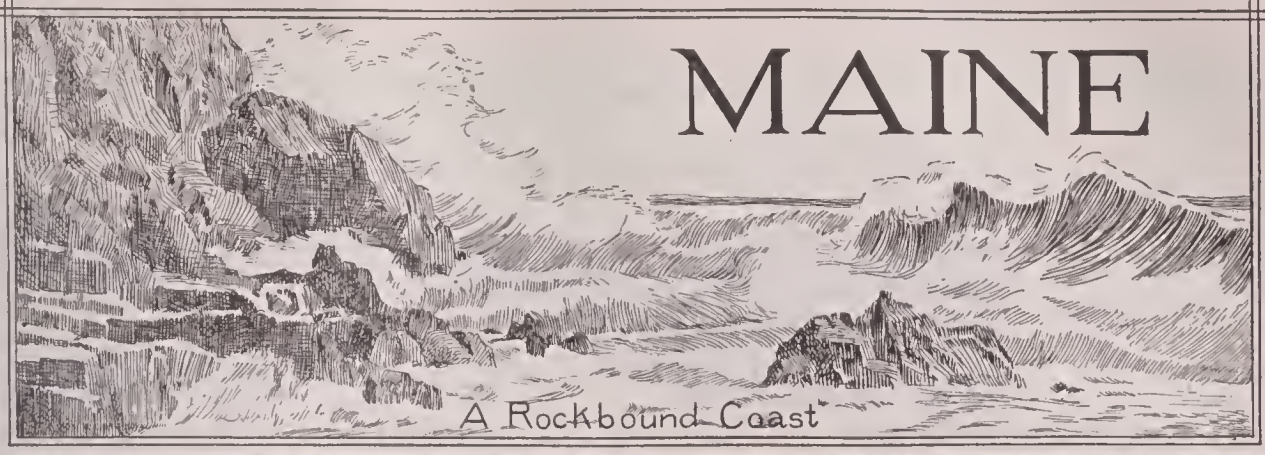
Fisheries. The deep-sea fisheries were the earliest industries of Maine, which now ranks second among the New England states in the value of its fisheries, being exceeded only by Massachusetts. Seventeen thousand, or over three-fourths of the total number of people in New England engaged in fishing, live in Maine, but the value of Maine's fishing products is only about one-seventh of the total output of New England. The clam, lobster and scallop fisheries are most important. In recent years the lobster supply has been protected by the state, and many hatcheries have been established. Salmon are caught in the Penobscot River, and herring, mackerel, cod, halibut, haddock and smelts are taken in the deep sea and prepared for the market.

Minerals. Owing to the fact that much of Maine is formed by worn-down mountains, granite of all varieties is quarried in great, though decreasing, quantities. With an annual product valued at about $2,000,000, the state has usually ranked with Vermont and Massachusetts as a leading source of granite, but in 1914 it was exceeded by California. It supplies more than one-third of the feldspar of the United States, a mineral used in the manufacture of porcelain, enamel tile, glazed earthenware, emery wheels, sandpaper and opalescent glass.

In the output of slate, Maine stands third among the states. Large quantities of lime are made from the streaked limestone found in Maine. Nowhere else in the world are such large and beautiful tourmaline crystals found. Although the state does not produce a great quantity of minerals, because of their high price it is among the leading states in their value. The total income from mineral products is about $4,000,000 a year.

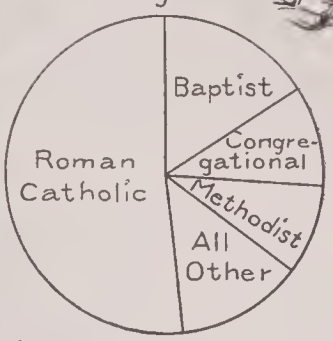
Manufactures. The great natural resources of Maine, in furnishing water power and cheap transportation, have made manufacturing an important industry. During the last half of the nineteenth century there was an increase of 6.2 per cent in the manufactures of the state, and Maine now ranks twenty-sixth among the manufacturing states of the Union. The principal industries are the manufacture of paper and wood pulp, lumber milling, the making of cottons and woolens, the manufacture of boots

MAINE



A Rockbound Coast

Religions

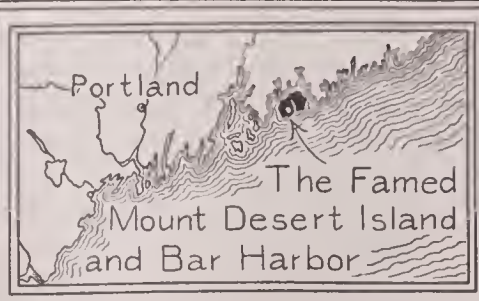


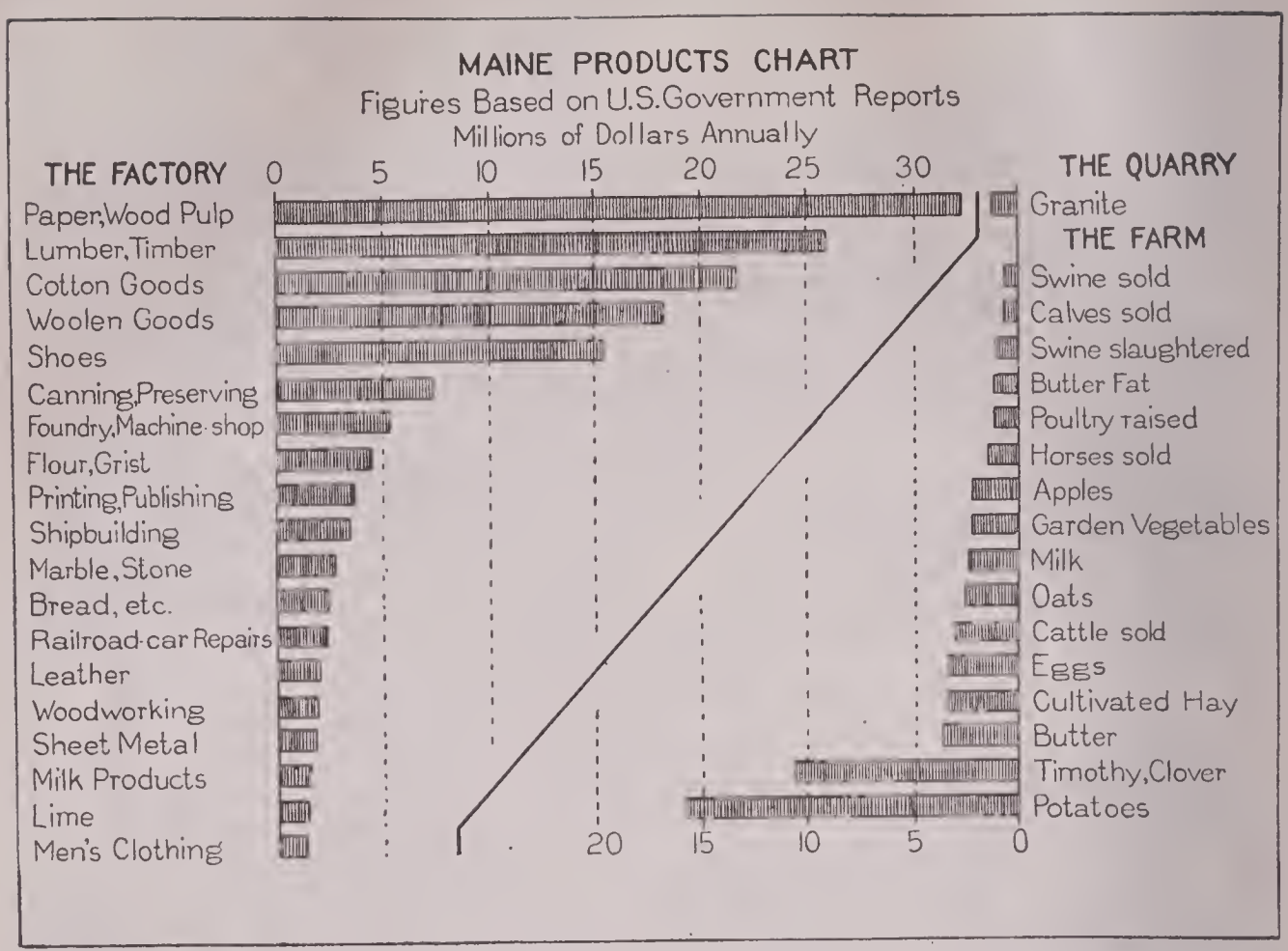
1790	3.2
1800	5.1
1810	7.7
1820	10.0
1830	13.4
1840	16.8
1850	19.5
1860	21.0
1870	21.0
1880	21.7
1890	22.1
1900	23.2
1910	24.8

People per Square Mile
by Decades

Center of
Population

Lumberman's Cabin





and shoes, the canning of fish and the milling of flour and grist. Lewiston, Auburn, Augusta, Bangor, Portland and Waterville are the chief manufacturing cities, and Bath is a great shipbuilding center. Although the shipbuilding industry of Maine, begun in 1607 when the Popham colonists constructed one of the first American ships, has declined, it is still important. Construction of steel ships has not entirely superseded the work of ship carpenters.

Transportation. The swift rivers of Maine are not navigable for any great distance; in the main they furnish transportation only for the logs from the lumber camps of the interior, but the state is traversed by many railroad lines. In 1914 there were 2,290 miles of railway in the state, the principal lines being the Maine Central, which is in every county but one; the Boston & Maine; the Bangor & Aroostook; the Sandy River & Rangeley Lake; the Grand Trunk and the Canadian Pacific railways. In 1914 the Portland Interurban, extending twenty-nine miles from Lewiston to Portland, was constructed. There are now over 490 miles of electric railway in the state. Anti-pass laws are enforced, and in 1913 a public service commission, consisting of three members appointed by the governor, was created to regulate railroad, street railway, express, gas, electric power, telephone and water companies, and prices.

Government. Maine has had but one state constitution, which was adopted at a town meeting in December, 1819, just prior to its admission into the Union as a state. Amendments to this constitution may be made by a two-thirds vote of both houses and a majority vote of the people at a general election. In 1914 fourteen amendments had been made. All male citizens who can read the constitution and write their names, and who have lived in the state at least three months, may vote. Paupers and untaxed Indians have no franchise. The Australian ballot has been used since 1891.

The legislative department consists of a senate of thirty-one members and a house of representatives of 151 members, all of whom are elected at the same time for two years. The legislature meets the first Wednesday in January. By a two-thirds vote it may overcome the veto of the governor. Revenue bills originate in the house of representatives, which also has the power of impeachment. Maine sends four members to the United States House of Representatives.

The executive power is vested in a governor, elected for a two-year term by popular vote, and an advisory council of seven, appointed by

RESEARCH QUESTIONS ON MAINE

(An Outline suitable for Maine will be found with the article "State.")

What college of Maine had as its graduates two of the most famous writers the United States has ever produced?

What county raises the most potatoes of any in the country? Which county is second? About how much difference is there between them?

How many states manufacture more products than Maine? What was the first important industry of the territory? Is it still of any importance?

Of what state did this region once form a part?

What was the "Ohio fever," and how did it affect this territory?

When did Maine pass its first school law? How long has education been compulsory?

Why is the climate somewhat colder than that of various other places in the same latitude? What advantage does this bring?

What important product of this state is widely used in making roofs? What is the most beautiful product of its mines?

What was the first name given to the region? With what is that name associated in your thoughts?

What distinction has the strip of coast between Eastport and Portland?

What part did the Glacial Period have in determining the chief products and industries of this state?

Who were probably the first white men to visit the Maine coast? Through whom did knowledge of the region first reach Europe?

About how many Indians remain in the state? How do they differ from the Indians of Iowa?

In what way does the coast of Maine resemble that of Norway? Did the same agency determine both?

How many of the New England states surpass Maine in value of fishery products? How many in the number of people engaged in fishing?

What laws have been passed since 1908 which show the progressive character of the state?

About how many more inhabitants has Maine than it had when it became a state?

What is the largest inland body of water in New England?

What have the rivers of Maine had to do with its industrial development?

What steps has the state taken to prevent the total destruction of its forests?

How long has this state had a prohibition law?

Upon how many states of the Union does Maine border? Is the same thing true of any other state?

How many times as high as the loftiest point in Maine is the tallest peak of Montana? Of Arizona?

What important part might some product of Maine have taken in making the material of which this book is composed?

How many constitutions has this state had?

What do the popular name and the state flower indicate as to Maine's plant growth?

What is almost the only product which is carried on the rivers of Maine?

How are railway rates regulated?

the legislature. The governor has power to remit penalties, grant reprieves, pardons and commutations. In case of vacancy in the office the president of the senate and the speaker of the house are next in line for the governorship. The state secretary and treasurer are elected biennially by joint ballot of the legislature.

At the head of the judiciary department is the supreme court, meeting each year at Augusta, Bangor and Portland, and having eight judges appointed for seven years by the governor. There are superior courts, each having one judge, in the counties of Cumberland and Kennebec. These are appointed for a term of seven years. Probate judges are elected by the people of each county for four years. Municipal and police court judges are appointed for four years by the governor and council. The attorney-general is elected for two years on joint ballot of the legislature.

Maine is notable as being one of the leading states in the prohibition movement, having passed a prohibition law in 1846, which was made part of the state constitution in 1884. As early as 1677 and 1690 laws were made in the colony that "henceforth no rum or other strong liquor be sold except in case of necessity." In 1913 a law was passed against public drinking of any intoxicating liquor.

Maine is the only state retaining organized "plantations," which are unorganized townships of at least 200 inhabitants, having charters, officials and school councils, and being free from state taxation except by special legislative order. Other unincorporated districts called grants, surpluses and tracts still exist.

In 1908 the initiative and referendum were adopted by the people (see INITIATIVE AND REFERENDUM). Recent state legislation shows increasing interest in charitable institutions, and in industrial and welfare movements. In 1913 a state board of charities and corrections was created; a law was passed requiring state aided hospitals to receive inmates of state schools without charge; farms for inebriates were established in Cumberland and Penobscot counties. In 1915 laws were passed prohibiting children under fourteen years of age from employment in factories or mercantile establishments, and providing that all children's homes be licensed. An industrial accidents law was passed in 1913 and the next year a workmen's compensation law was enacted (see EMPLOYERS' LIABILITY).

There is a state prison at Thomaston; a reform school for boys at South Portland; an industrial school for girls at Hallowel; a military and naval orphanage at Bath; institutes for the blind and deaf at Portland; insane hospitals at Augusta and Bangor, and a home for the feeble-minded at West Pownal. All of these are maintained by the state. Almshouses and asylums are supported by counties.

History of Maine

Exploration. Probably the first white men to visit Maine were the Norsemen under Thorwald, who are believed to have made a settlement there in the eleventh century. The region remained practically unknown, however, until 1524, when Verrazano discovered the Gulf of Maine, and called the country *New France*. Gosnold, DeMonts, the Cabots and Weymouth explored the coast, and John Smith in 1614 mapped the shore line and gave the territory the name of *New England*.

Settlement. In 1603 Henry IV of France granted a charter to DeMonts for all of the territory between 40° and 46° N. latitude and called it *Acadia*. Upon this charter and the voyage of Verrazano the French based their claim to the region. In 1607 the territory was granted by James I to the Plymouth Company, and a colony under George Popham and Raleigh Gilbert was established at the mouth of the Kennebec.

In 1622 the territory between the Merrimac and Kennebec rivers was given to Mason and Gorges. In 1636 Gorges established a government in the eastern section, which was the first organized government in Maine. The next year a charter naming this land the *Province of Maine*, to distinguish the mainland from the numerous islands off the coast, gave the territory to Gorges, and Georgiana, the first incorporated town of America, was founded here in 1641 on the present site of York.

As a Part of Massachusetts. In 1677 Massachusetts purchased the province, which, after being again made a royal territory by William and Mary, was incorporated with Massachusetts by charter in 1692. Maine gave loyal support to England in the French and Indian wars, to the colonies in the Revolution, and to the states in the War of 1812, during which its manufacturing industries suffered greatly. The population was decreased by the Ohio

fever, as the impetus towards western migration was called in 1815 and 1816.

Statehood. In 1820 Maine was admitted as an antislave state, offsetting the new slave state, Missouri. The northern part of Maine, which had been ceded to the United States by Great Britain in 1783, at the close of the War of the Revolution, was transferred to the state. The north and northeastern boundaries, however, were long disputed, but were settled by the Webster-Ashburton Treaty in 1842, when Maine definitely assumed its present limits (see WEBSTER-ASHBURTON TREATY).

THE NORTHEAST BOUNDARY

Solid line, United States claim; dotted line, British claim. The northern limits of the area in solid black show the boundary as fixed by the Webster-Ashburton Treaty.

In the War of Secession Maine furnished 75,000 troops to the Union, incurring a debt of $12,000,000 for their equipment, $6,000,000 of which was later refunded by the national government. Maine has never had any serious state troubles. Since 1883 the state has been Republican, although in 1910 and 1914 Democratic governors were elected. R.J.A.

Consult Hale's *The State of Maine;* Holmes' *Makers of Maine;* Burrage's *Beginnings of Colonial Maine.*

Related Subjects. In connection with the study of Maine, the reader is referred to the following articles in these volumes, which contain much added information:

CITIES AND TOWNS

Auburn	Biddeford
Augusta	Lewiston
Bangor	Portland
Bar Harbor	Sanford
Bath	Waterville

LEADING PRODUCTS AND INDUSTRIES

Apple	Hay
Dairying	Paper
Fish	Potato
Forests and Forestry	Tourmaline
Granite	

RIVERS

Kennebec	Saco
Penobscot	Saint John

UNCLASSIFIED

Katahdin	Mount Desert
Moosehead Lake	

MAINE, UNIVERSITY OF, the state university of Maine, was founded at Orono in 1865 under the name State College of Agriculture and Mechanic Arts. It was opened in 1868, and received its present name in 1897. The University of Maine and that of Vermont are strictly the only two state universities in New England. The institution comprises the colleges of arts and sciences, agriculture and technology, and the college of law, at Bangor; the Maine Agricultural Experiment Station is also a university department. Degrees are conferred in arts, philosophy, science, law, agriculture, engineering, forestry, home economics and pharmaceutical chemistry. Both men and women students are admitted, the average enrolment exceeding 1,200. There are about 150 members on the faculty. The library contains about 55,000 volumes, and the college property is valued at over $818,400. R.J.A.

MAINTENON, *maN t' nawN',* FRANÇOISE D'AUBIGNÉ, Marquise de (1635-1719), the second wife of Louis XIV of France. Her father and mother died while she was but a young girl, and she was cared for by her aunts, who had her educated in a convent. When she was sixteen, Scarron, the poet and wit, made her acquaintance, and was impressed with her helpless state no less than with her beauty and cleverness. At length he offered either to marry her or to pay for her admission to a nunnery, and she chose the former alternative. He was deformed, and much older than she, but he entertained in his home the most brilliant intellectual society of the day, to which she was an added attraction.

When Scarron died in 1660 she was again left in poverty, but Madame de Montespan, the king's mistress, procured for her a pension and later the position of governess to the king's children. She soon won the favor of the king, and after the death of the queen he married her, though she was never openly recognized as his wife. Her influence over him was very strong, and always exerted on the side of right, though her political suggestions were not always of the wisest. She had founded, soon after her marriage with the king, a school for young ladies at Saint Cyr, and to this she retired after his death. It was for the pupils of this

school of Madame de Maintenon's that Racine wrote his *Athalie* and *Esther*.

Consult Blennerhassett's *Louis XIV and Madame de Maintenon*.

MAINZ, *mine'tz,* a famous German fortress of the first rank, the seat of a Roman Catholic bishop and the largest town in the grand duchy of Hesse, is situated on rising ground along the left bank of the River Rhine, twenty miles southwest of Frankfort. It is one of the most ancient of German cities, but its oldest part was modernized after its complete destruction in 1857, caused by a powder-magazine explosion. An entire new quarter has been added since the recent widening of the fortified circuit. Mainz was the birthplace of Gutenberg, who invented the art of printing with movable types, and a fine statue by Thorwaldsen has been erected here in his honor; his house, too, is one of the places visited by the tourist.

The city is an important center of the Rhine trade with Holland and Belgium, and also carries on a large transit trade by railway. Its manufactures include furniture, leather goods, musical instruments, machinery and chemicals, while brewing, printing and market-gardening also represent important activities. Although the history of Mainz is associated with Rome from the year 13 B.C., the real importance of the town dates from the Frankish emperors. It was several times in possession of France, and in 1816 was assigned to the grand duchy of Hesse. After 1866 it was held by Prussian troops, and in 1870 it was declared an imperial fortress. Population, 1912, 118,000.

MAIR, Charles (1838-), a Canadian poet and journalist, best known for his poetic drama *Tecumseh,* which shows a clear insight into Indian character. Mair was born at Lanark, Ont., was educated at the Perth grammar schools and at Queen's University, Kingston. Later he studied medicine, and for a time was engaged in business. At an early age he began to write for the press, both in prose and verse, and his first volume, entitled *Dreamland and Other Poems,* appeared in 1868. In the meantime Mair had become the Fort Garry (Winnipeg) correspondent of a Montreal newspaper. He was in Fort Garry at the time of the Red River Rebellion, and was imprisoned and condemned to death, but managed to escape. During the Saskatchewan Rebellion he served as a medical officer. His most important work, *Tecumseh,* appeared in the following year, 1886. Noteworthy among his other books are *The Fountain of Bemini; The Last Bison; The Conquest of Canada,* and *Through the Mackenzie Basin.* After the Saskatchewan Rebellion Mair made his home in the West, in turn in British Columbia, Saskatchewan, Alberta and then British Columbia again.

MAISONNEUVE, *ma zo nev',* a city in Quebec, on the island of Montreal, about three miles northeast of the city of Montreal. Although legally a separate city, Maisonneuve is really an industrial suburb of Montreal. Running through both of the cities are the Canadian Pacific, the Canadian Northern and the Grand Trunk railways, all linked by terminal electric railways. Maisonneuve has regular steamship connection with various ports on the Atlantic coast, the Saint Lawrence River and the Great Lakes. In 1910 the city ranked sixth among the manufacturing centers of the Dominion, with an output of $20,813,774, a total more than three times as great as the output of 1900. There are about fifty large industrial establishments, employing approximately 20,000 people. Most important among the products are cans, spool cotton, licorice, shoes, shoe machinery, bridges, wall paper and biscuits. Noteworthy buildings are the city hall, public market and gymnasium, the dry dock and the government navy yard. Population in 1901, 3,958; in 1911, 18,684; in 1916, 34,856.

MAISONNEUVE, Paul de Chomedey, Sieur de (? -1676), a French soldier and colonial governor, founder of Montreal and for twenty-two years governor of the colony. He entered the French army at an early age, and served with distinction in many campaigns. About 1640 he became interested in the proposal to found a religious colony in New France and in the next year, under the patronage of a pious French nobleman, sailed from France with a small band of enthusiasts. Before the forty-five emigrants (four were women) set sail, they met in the great cathedral of Notre Dame in Paris and solemnly consecrated the new settlement to God. Maisonneuve and his band reached Quebec in the autumn of 1641 and spent the winter there. The governor of Quebec, fearing that the new settlement might prove a dangerous rival, pointed out the dangers from Indians, but Maisonneuve replied with characteristic fearlessness: "I have not come here to deliberate, but to act. It is my duty and my honor to found a colony at Montreal, and I would go if every tree were an Iroquois." The new settlement was founded on May 18, 1642. "The afternoon waned,"

says a chronicler, "the sun sank behind the western front and twilight came on. Fireflies were twinkling on the darkened meadow. They pitched their tents, lighted their bivouac fires, stationed their guards, and lay down to rest. Such was the birthday of Montreal." Maisonneuve was governor of the colony for the first twenty-two years of its existence, and during this period all his wisdom and ability were needed to keep the colony from the control of the Sulpicians; but he was finally removed by De Tracy in 1665 because he insisted on maintaining the practical independence of Montreal from Quebec. The last decade of his life he spent in obscurity in France.

MAIZE, *maze,* one name applied to the common corn, or Indian corn. See CORN.

MAJESTY, *maj'es ti,* a term used to express the royal power and dignity of an emperor, king or queen, as the head of a nation. The name is derived from the Latin word *majestas,* meaning *greatness* or *grandeur.* In the Middle Ages the title was conferred upon the successors of the emperors of Rome. The term was subsequently used in connection with kings, and distinctions were made between *imperial* majesty and *royal,* or *kingly,* majesty, which was a step below that of an emperor. The fullest form of the expression is "His Most Gracious Majesty." The reigning king of any country has the title of "His Majesty," it being abbreviated to H. M. The initials H. I. M. refer to "His Imperial Majesty," the title of any reigning emperor.

MAJOLICA, *ma jahl'i ka,* an earthenware of beautiful luster, believed to have been named after the island of Majorca, home of the Moorish potters, from whom the ware had long been imported into Italy. The term *majolica* was first used in the middle of the sixteenth century, when it was applied to many varieties of glazed pottery, and to-day a large class of wares is often called majolica which should be properly termed *faïence.* The earliest date found on an Italian-lustered piece is of the year 1489. The only men acquainted with the use of luster were Pesaro, Gubbio and Deruta, and after a vogue of eighty years it became a lost art, about 1570. The craft has been revived with varying success, but the new enamels cannot compare in beauty with the old models. The finest specimens of majolica were made in Northeastern Italy; vases, pitchers, plates, bottles and odd-shaped flasks were the most commonly-decorated objects, but tiles were sometimes made of majolica for floors and walls.

MA'JOR, the Latin word for *greater,* is a title of a military officer. In the army of the United States a major is a commissioned officer ranking above a captain and below a lieutenant-colonel. He is a battalion commander under the orders of a regimental commander, each regiment of infantry or cavalry having three majors. As insignia of his office the major wears a gold-embroidered leaf at each end of his shoulder straps. An officer who performs for a brigade the duties ordinarily discharged by a major in a battalion is known as a *brigade major,* and the officer ranking next above a brigadier-general bears the title *major-general.* This is the highest permanent grade in the United States army.

In the British and Canadian service *major* is also the title of an officer ranking between a captain and lieutenant-colonel. In the command of a cavalry regiment, infantry battalion or artillery brigade the major is second in authority to the lieutenant-colonel. Majors also command squadrons of cavalry and batteries of artillery. See RANK IN ARMY AND NAVY.

In the United States army the pay of a major is at first $3,000 per year, but it increases $25 per month after each five-year period of service until the maximum pay of $4,000 is reached. In Great Britain the pay is $1,421; in France, $1,063; in Germany, $1,560; in Russia, $398; in Japan, $774.

MAJOR, a musical term, for explanation of which see MUSIC; SCALE.

MAJORCA, *ma jawr'ka,* the largest of the Balearic Islands, a group in the Mediterranean Sea east of Spain, of which they are a possession. The famous majolica pottery takes its name from the supposition that the first specimens of the ware were made on the island of Majorca. The island is 107 miles southeast of the mouth of the Ebro, the nearest point on the Spanish coast, and is 171 miles north of Algiers. It is about sixty-four miles long, forty-eight miles wide, and has an area of about 1,386 English square miles. The northwestern part is mountainous; the southern half of the island is broken up by hills, valleys and fertile plains. The inhabitants resemble the Spaniards in appearance and are industrious agriculturists. The chief products of the island are fruits, wines, marble, cereals, hemp, flax and silk. The capital, Palma, is the principal town. Population, 1910, 264,200.

MAKAW', or **MAKKAH,** the only tribe of North American Indians called *Cape Indians,* although other tribes once lived on promon-

tories. Their tribal name, Kew-net-che-chat, means *cape people.* The Makaws inhabit the region along Puget Sound and along the Strait of Fuca, on Cape Flattery. They excel in the management of canoes and are bold and daring fishermen, venturing farther from land in search of fish than any of the neighboring tribes. Formerly they were a warlike tribe, but are now fairly civilized and live upon a small reservation on the cape. The women are expert basket weavers. They number less than 400.

MALACCA, or **MALAKKA,** *ma lak' a,* a territory in the British Straits Settlements, on the southwest coast of the Malay Peninsula, the southernmost point in Indo-China and ninety miles above the equator. It has an area of about 700 square miles. Next to India it once had more commerce than any other part of continental Asia. It is low and swampy, and the principal products are rice, pepper and sage. The principal exports are tin and rubber. In 1911 the population was 125,000.

Malacca, the capital of the territory of Malacca, is situated 125 miles northwest of Singapore, a town whose growing trade has decreased the commercial importance of Malacca. It was founded by the Portuguese in the fourteenth century, passed into the hands of the Dutch in 1641, and was taken by England in 1824. Population, 1911, 21,200.

Strait of Malacca, a body of water between the Malay Peninsula and the island of Sumatra, connecting the Bay of Bengal with the South China Sea. Its breadth varies from 50 to 250 miles and it is 500 miles long. The narrower end has a number of small islands; one of these is Singapore, on which is the important trading center of the same name. See SINGAPORE.

MALACHI, *mal' a ky* (420 B.C.), the last of the Hebrew minor prophets, and writer of the book of *Malachi.* The name means *messenger of Jehovah;* it is also translated as *my messenger.* His writings supplement those of Ezra and Nehemiah, and his prophecies show that they were given after the return of the Jews to Jerusalem and the rebuilding of the Temple. Some modern authorities consider the name to be a title and not the real name of the prophet.

Book of Malachi. This is the last book of the Old Testament, and it is divided into three sections. The first represents Jehovah as the loving father and ruler of His people; the second rebukes the priests for their departure from the true worship and reproves the people for mixed marriages; the third foretells and emphasizes the coming of the Messiah.

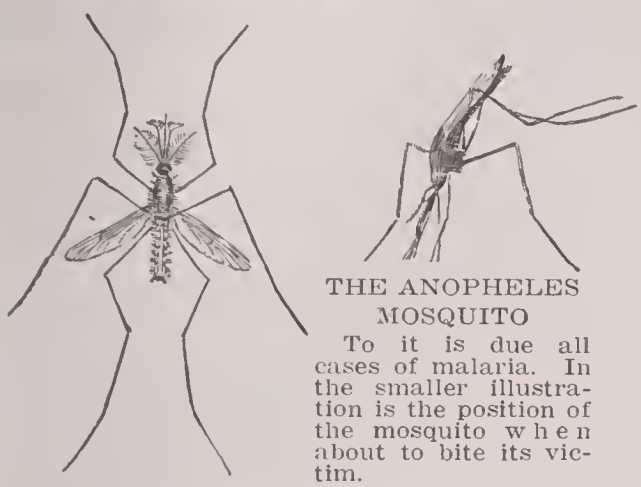
MALACHITE, *mal' a kite,* a copper ore usually found massive in structure, is a beautiful green in color, and is used for ornaments, mosaics and as a veneer for costly furniture. It is formed in layers varying in shade from apple to verdigris green. Of old, amulets of malachite were thought to be a protection against lightning, witchcraft and contagion. By some authorities the ore is thought to be identical with the Hebrew stone *soham,* one of the sacred jewels of the high priest's breastplate. Ground to a powder, it is used as pigment under the name *mountain green.* The chief sources of the mineral are Siberia, Russia and Australia.

MALAGA, *mah' lah gah,* one of the most important seaports of Spain and capital of a province of the same name, is situated in the extreme south of the country, on the Mediterranean Sea, sixty-five miles northeast of Gibraltar. Because of its mild and uniform climate, Malaga has become famous as a resort for invalids. Though the city's trade has shown a decline in recent years, due to disease-ravaged orange and lemon groves, unscientific methods of agriculture and insufficient means of communication; still olives, olive oil, wine, raisins, lead, almonds, lemons, grapes and esparto grass are exported annually to the amount of $5,000,000. Manufacturing industry has been given renewed impetus, and there are thriving establishments for making cotton and linen goods, artistic pottery, flour, soap and wine and oil presses. Of the 2,500 vessels which enter the harbor annually, one-sixth are British and three-fourths are Spanish.

Under the Romans Malaga was a flourishing town, having been founded by the Phoenicians. It was also an important city under the Moors, and there still remain a Moorish castle, built in the thirteenth century, and similar Moorish landmarks in the older parts of the town which stand out in marked contrast to the imposing modern structures in the newer quarters of the city. Population, 1910, 136,365; the number of people has varied but little since 1880.

MALARIA, *ma la' ri a,* an infectious disease caused by an animal germ that feeds on the blood of man and certain mosquitoes. It is characterized by chills, fever and sweating, and is known also as *ague, marsh fever, chills and fever* and *malarial fever.* The name *malaria* is really a misnomer; it is the Italian word for *bad air,* and was applied to the disease because formerly it was believed to be caused by poisonous emanations from swamps and marshes. This impression prevailed until the latter part

of the nineteenth century, but in 1880 a French surgeon found an animal germ in the blood of his malaria patients, and this discovery led scientists to the conclusion that the disease was caused by some biting insect that lived in swampy districts. Investigations followed, and the insect was found to be the species of mosquito known as the *Anopheles* (see MOSQUITO). The civilized world is now engaged in relentless warfare against this dangerous insect, and



THE ANOPHELES MOSQUITO

To it is due all cases of malaria. In the smaller illustration is the position of the mosquito when about to bite its victim.

wherever it has been exterminated malaria is unknown. Attacks on the mosquito have rendered the fever-infested districts of Cuba and the Canal Zone on the Isthmus of Panama wholly free from the disease (see GORGAS, WILLIAM C.).

Symptoms. A typical attack of malaria progresses through three stages—the cold, the hot and the sweating. The first is preceded by headache and a general feeling of discomfort; gradually a chill comes on, causing the patient to shake violently, while the temperature rises to 102° or more. The shivering stage lasts about ten minutes and is followed by the hot stage, during which the skin becomes flushed. A period of from one-half to three or four hours elapses before the sweating stage begins; then beads of water appear on the forehead and finally the whole body is bathed in perspiration. Then the fever and headache subside and in the course of an hour or two the patient falls asleep and the attack is over for the time being. Paroxysms recur at regular intervals of from one to four days until the poison is eliminated from the system.

Treatment. It has been said that the settlement of much of the American continents would have been impossible without quinine, the only reliable remedy for malaria that is known. Doses of this drug usually cure even a persistent attack. The disease occurs in its most dangerous form in the tropics, where it is often fatal. Repeated attacks cause the sufferer to become seriously anaemic, a condition that needs special treatment by a competent physician. See ANAEMIA. S.C.B.

Consult Ezdorf's *Malarial Fevers;* Herms' *Malaria, Cause and Control.*

MALASPINA, *mah lah spe' nah,* **GLACIER,** the largest glacier in Alaska, in area equal to one-tenth of Switzerland, the country famous for its glaciers. It is more like a lake of ice than a river; it does not flow down a valley but lies in a great table-land, and is formed by the inpouring of several valley glaciers. On the western coast of the territory it overlooks the Pacific for scores of miles, and as its great mass moves slowly but constantly under the pressure of the ice rivers behind it, huge masses break off into icebergs, which render sea travel in near-by waters difficult and dangerous.

Every characteristic feature that other famous glaciers have the Malaspina possesses. There are fathomless crevasses that reach far downward; there are rushing streams in summer, and lakes dammed up by heaps of débris; and there are moraines. Indeed, the moraines along its border constitute one of its strangest features; below, reaching to a depth of a thousand feet or more, there is ice which never melts; above, on the solid matter deposited through the ages, are spreading trees, and, in the summer, blossoming flowers. See GLACIER; MORAINE.

MALAY ARCHIPELAGO, *ma lay' ar ki pel' a go,* the largest group or system of islands in the world, situated between the southeast of Asia and the continent of Australia, the equator running through the middle of the group. The archipelago includes the Moluccas, the Sunda Islands, New Guinea, the Philippine Islands and dependent groups (see map, in article OCEANIA). The islands are all of volcanic formation. It is assumed that Asia and Australia were joined together in prehistoric times, and when separated the land was broken up, leaving only the existing islands above the sea. They possess an intensely fertile soil, with a great wealth of vegetation. Oranges, mangoes, guavas, rice, maize, sugar, coffee, cacao, cocoanut, sago, breadfruit and yams flourish, and gutta-percha, camphor and other forest products are exported. (All of these products are described in their places in these volumes.)

Gold, manganese and platinum are found in many of the islands; copper is exported from the Philippines, and there are extensive tin mines in several islands. In Java have been

found fossil remains of a prehistoric animal intermediate between man and the apes; the archipelago also abounds in other objects of interest to zoölogists and naturalists. The native inhabitants belong chiefly to the Malay and Papuan races. Politically the greater portion of the archipelago is under the Dutch government. See East Indies, Dutch.

MALAY PENINSULA, the southernmost tip of Asia, a drumstick-shaped strip of land extending from Burma and Siam to the East Indian islands (see color map, Asia, for location). It is about nine hundred miles long. Its upper third, though less than two hundred miles wide, is divided longitudinally between Burma on the west and Siam on the east; its center third is a part of Siam and its southern third includes the Federated Malay States (which see), with a handful of other tiny native states protected by Great Britain, and the Straits Settlements. The lower half of the peninsula is paralleled by the Dutch island of Sumatra, from which it is separated by the Malacca Strait. Through this strait, which from a width of three hundred miles narrows down to less than twenty-five at its southeastern end, passes nearly all the rich traffic from the Suez Canal or India to Siam, Indo-China, China, Japan and the Philippines, and much of that to the East Indies and Australia.

The Malay Peninsula approaches nearly to within a degree of the equator, and is a distinctly tropical land. Though traversed by mountain ranges, some of which rise to a height of over 7,000 feet, it has an unbroken covering of the densest of equatorial jungles, scarcely any of which have as yet been penetrated by man. There are, however, hundreds of rivers, along the banks of which dwell the two million or more natives. Though once considered an impossible region for the white man, the peninsula now has a good reputation for health. Nevertheless the population is almost entirely composed of natives, Chinese and British Indians. The natives include Siamese, Malays, a third race which resembles the Indo-Chinese, and a fourth, negritos. The most famous product of the peninsula is tin, which is found in alluvial deposits; no other country produces as much. Other exports—among them rice, tapioca, copra (dried cocoanut), sugar and pepper—are typical of the tropics. Rubber plantations are increasing in number. See Federated Malay States.

Consult Fraser's *Quaint Subjects of the King;* Wilkinson's *Malay Beliefs.*

MALAY RACE. See Races of Men.

MALDEN, *mawl'den,* Mass., a city which includes several villages in Middlesex County, five miles north of Boston, of which it is a residential suburb and postal substation. It is on the Malden River and is served by two divisions of the Boston & Maine and by a number of interurban lines. Freight is largely handled by river boats. The area of the city is nearly five square miles. The population in 1910 was 44,404; in 1916 it was 51,155 (Federal estimate).

Malden has an excellent park system, and northwest of the town is Middlesex Fells, a state reservation. The city has an attractive residence section, and contains a public library, an auditorium, a Y. M. C. A. building, a hospital and a Home for Aged Persons.

In the manufacturing section are rubber boot-and-shoe factories, whose annual output is valued at $6,000,000, and manufactories of glue, cords and tassels, sandpaper, emery paper, boot-and-shoe lasts, fire hose, knit goods and soap.

Malden was first settled about 1640, and was a part of Charlestown until 1649, when it was incorporated as Mauldon. It was chartered as a city under its present name in 1881.

MAL'DIVE ISLANDS, a group of low, coral islands 400 miles southwest of Ceylon, composing a chain in the Indian Ocean. They have an average elevation of from six to twenty feet above sea level. These islets are arranged into twelve groups known as atolls (see Atoll), and number about 1,000, of which nearly 200 are inhabited. The total land area is about 115 square miles. Though under British protection, they are governed by an elected sultan, who pays a yearly revenue to the British government at Ceylon. Rich vegetation covers the islands, and cocoanut palms yield edible nuts. Breadfruit, citron and fig trees produce abundant fruit, and wild fowl and fish are plentiful. The inhabitants are of mixed Arab and Singhalese extraction, and are of the Mohammedan faith. They are expert sailors and carry on an active trade in their own vessels with Ceylon, Bengal and the Malabar coast, exchanging mats, fruits, nuts and cowrie and tortoise-shells for tobacco, sugar, rice and manufactured goods. The climate is hot and somewhat unhealthful. Population, about 50,000.

MALICE, *mal'is,* in law, is ill will toward another so strong that it prompts an injurious act. A crime committed with the hope of personal gain is not necessarily malicious. Wil-

fully harming the person or property of another for spite, revenge or for the mere wish to injure is malicious, so also is the intentional neglect of an obligation to others. Where the act is specially deliberated and not the immediate result of a sudden determination, there is said to be *malice aforethought. Malicious mischief* is injury done to the property of another without cause, even if committed without knowledge as to the indentity of the owner.

MALINES, *ma leen',* in German, **MECHLIN,** *meK'lin,* is a city of Belgium, situated on the Dyle River, fourteen miles southeast of Antwerp. Lying in the direct line of the German drive on Antwerp, early in the War of the Nations (1914) the city suffered a heavy bombardment which destroyed a considerable portion of it. Before its capture by the German forces it was a city of many fine squares, well-built houses surrounded by extensive gardens, and wide, regular streets—all spotlessly clean. It had, however, fallen far behind many of the other cities of Belgium in industrial enterprise and commercial activity. Its manufactures consisted chiefly of felt and straw hats, woolen stuffs and tapestries, furniture, carpets and large bells. Malines for centuries has been the religious metropolis of Flanders, and its monuments and curiosities are chiefly of a sacred nature. Its most noteworthy edifice, Saint Romauld's Cathedral, was built in the sixteenth century. It covers almost two acres and contains an altarpiece by Van Dyck and many other fine paintings and carvings. Population, 1910, 59,200. See WAR OF THE NATIONS.

MALLEABILITY, *mal e a bil'i ti,* a property possessed by most metals, which makes it possible for them to be hammered or rolled into thin sheets. Malleability, together with ductility, or the property of being drawn out into wire, is included under the general term of elasticity (which see). The degree of malleability increases with the temperature and with the purity of the substance. Lead, which is readily hammered out, and gold, which may be beaten into exceedingly thin gold leaf, are the most malleable metals. See MATTER, subhead *Properties of Matter.*

MALLORY, *mal'o ri,* STEPHEN RUSSELL (1813-1873), an American lawyer and political leader, the organizer of the Confederate navy. He had not only to organize and administer it, but to build the ships, provide as best he could for their ordnance and machinery; and create a naval force in a country whose ports were blockaded. Timber for the ships still stood in the forests; iron was in the mines, and there were no furnaces and workshops. Thus handicapped, he nevertheless created the Confederate navy. He was born at Trinidad, West Indies, where his father, a Connecticut shipbuilder, was temporarily located. The family removed to Key West, Fla., in 1820, and the son was educated at Mobile and at the Moravian Academy in Nazareth, Pa. He studied law, took an active interest in politics and early in life held a number of minor public offices, including inspector of customs at Key West, judge of Taylor County, and collector of the port of Key West.

From 1851 to 1861 he was United States Senator from Florida, and during most of the decade was chairman of the committee on naval affairs. He resigned when his state seceded from the Union, and President Davis at once appointed him Confederate secretary of the navy. He proved himself an efficient organizer, and held the office until the fall of the Confederacy. He was then held prisoner by the United States government for nearly a year, being pardoned by President Johnson in 1867. Thereafter he practiced law in Pensacola, which had been his home since 1858.

MALLOW, *mal'o,* a family of herbs and shrubs, all members of which secrete a sticky substance resembling mucilage. The hollyhock and hibiscus, both described in these volumes under their respective names, are familiar garden representatives, and another member of the family is the valuable cotton plant. The *common mallow,* whose trailing stems and pale-lavender blossoms are seen in the fields and along the roadsides throughout the United States, has become a weed. It bears a flat, circular fruit, formed from several united pods. When ripe these pods fall away separately, and are the "cheeses" which children take delight in eating.

The marsh mallow (which see) has been naturalized from Europe, and grows in the salt marshes of the Atlantic coast from Massachusetts to New Jersey. On its erect, branching stem, which grows from two to four feet high, are borne small clusters of pale crimson-pink flowers, which beautify the marshes of the Eastern coast in August and September. Its thick root, which secretes mucilage, is used in making candy. Another familiar species is the *musk mallow,* an escape from gardens. It has pale-rose or white flowers and takes its name from the faint, musklike scent of its foliage. The fiber is used in Syria for textile purposes.

MALMÖ, *mahlm'uh,* a seaport town of Sweden, ranking next in importance to Stockholm and Gothenburg and lying on the opposite shore of the Sound from Copenhagen, in Denmark. It is situated on a level plain and was formerly strongly fortified, but the only fortification now remaining is the citadel where the Earl of Bothwell, husband of Mary, Queen of Scots, was imprisoned in 1573; this is now used as a prison. About 3,500 vessels leave the docks of this busy seaport each year in normal times, carrying the city's exports of grain, flour, gloves, chocolate, etc., to many European cities. Malmö is the terminus of eight railway lines. Its town house is an example of Renaissance architecture of the year 1546. Population in 1912, 92,340.

MALORY, *mal'o ri,* or **MALLORE,** Sir Thomas, an English author, famous as the writer of the fine romance of chivalry, the *Morte d'Arthur,* which contains the stories of Arthur and the Round Table, afterward adapted by Tennyson in the *Idylls of the King.* Little is known about the author of these tales, except that he flourished in the latter half of the fifteenth century. *Morte d'Arthur* is the first important English prose romance, and was probably translated from the French. Caxton's prologue quaintly and fittingly describes the book:

> Herein may be seen noble chivalry, courtesy, humanity, friendliness, hardiness, love, friendship, cowardice, murder, hate, virtue and sin. Go after the good and leave the evil, and it shall bring you to good fame and renown. And for to pass the time this book shall be pleasant to read in; but for to give faith and belief that all is true that is contained herein, ye be at your liberty.

MALT, *mawlt,* the name given to grain that has been allowed to germinate or sprout for brewing and distilling purposes. The germination is effected by applying water and heat and is allowed to proceed only until the grain has become soft or mushy and has thrown out tiny sprouts. When the malt is crushed the starch in it is converted into sugar and gummy substances known as maltodextrins. The process is mainly for the purpose of rendering the various elements in the grain soluble in water so that some part of the food properties may pass into the liquid which is to be brewed or distilled.

The greater portion of all malt is made from barley, though small quantities of oats, wheat, rye, maize or rice are sometimes added in the making of beer or whisky. The barley is steeped in huge cisterns for about two days at a temperature of 60° F. and is then thrown in rectangular heaps on floors, where it germinates for about eight days. It is then dried in a kiln for three or four days at a temperature varying from 100° F. to 160° F. After the rootlets have been picked off, the grain is ready for the distilling or brewing process. One hundred parts of barley yield about ninety-two parts of dry malt, but the loss in nourishing value is far greater, probably as high as sixty per cent. See Distillation; Distilled Liquors; Alcoholic Drinks.

MALTA, *mawl'ta,* an island in the Mediterranean Sea, between Sicily and the African coast, considered by its loyal people as "the flower of the world." In reality it is a land of yesterday, as it still retains many of its characteristics of a thousand years ago. It is one of the most important of the British dependencies and the headquarters of the British Mediterranean fleet; though small, it is one of the most important spots in the world. The area is about ninety-five square miles, and the additional dependencies include Gozo, Comino, Cominotto and several islets around the coasts of the larger islands. The shore is broken into several good harbors, the most important being at Valetta, the capital. As this is too small to accommodate the British fleet, a new breakwater was constructed in 1909. Malta has a bare, stony appearance, because of the absence of trees and on account of the stone walls which surround the gardens and fields to shield the crops from the violent winds. Although there are but few streams, water is easily obtained from numerous springs. Corn, cotton, potatoes, fruits and clover are raised in great quantities. Filigree ornaments, lace and jewelry constitute the leading articles of manufacture.

LOCATION MAP

During the winter months many tourists visit Malta, as it is interesting historically, as well as architecturally. The island was held by the Knights of the Order of Saint John of Jerusalem from 1530 to 1798, when it was surrendered to Napoleon (see Knights Hospitalers of Saint John). In 1800 the English took it from the French and formally annexed it in 1814.

Italian and English are the languages of the educated classes, but the people generally speak a mixture of Arabic and Italian. Population in 1911, including a garrison of about 8,000 British troops, 228,530.

MALTA, Knights of, an ancient and illustrious Order founded in Jerusalem in 1048, and first called *Knights of Saint John,* or *Knights Hospitalers of Saint John* (which see). See, also, Malta.

MALVERN HILL, Battle of, the last of the Seven Days' Battles of the War of Secession, was fought at Malvern Hill, Va., fifteen miles southeast of Richmond, on July 1, 1862. The Federal army of the Potomac, numbering 80,000 men, was commanded by General McClellan, and the Confederate army of Northern Virginia, under General Lee, was about equal in strength. McClellan's communications with his base of supplies on the York River were cut, and he retreated under hardships and severe fighting to Malvern Hill, a strong position near the James River. The Confederates, flushed with previous victories, attacked him at this point; then ensued one of the fiercest battles of the war, lasting from early morning until evening, when the Confederates withdrew. The Confederate loss was about 5,000; the Federals lost about one-third that number. This battle ended the famous Peninsula Campaign. See War of Secession.

MAMELUKES, *mam'e lukes,* Turkish slaves who were taken into Egypt and who became so powerful that they established a dynasty of sultans who ruled Egypt from 1250 to 1517. As slaves they were placed in the army and rose to become the military aristocracy of the country, eventually filling all the highest posts in the state. Armies of Mamelukes overran Asia Minor, Syria and Cyprus and ruled the Eastern Mediterranean. The Mamelukes resisted the invasion of Egypt by Selim I of Turkey, but they were utterly defeated and Egypt became a Turkish province in 1517.

As the Turkish power declined later, the Mamelukes became more haughty and arrogant, and were again practically independent. Napoleon encountered them in 1798 at the Battle of the Pyramids and defeated them. It was treachery, however, that led to their final downfall; in 1811 Mehemet Ali caused a general massacre of them throughout the country. Their ambitions had plunged Egypt into anarchy for years, and their extinction was regarded by the Egyptian people as a merciful deliverance from oppression.

MAMMALS, *mam'alz,* members of the highest class of vertebrate animals, which includes man and all the animals which resemble him in the most important points of structure. To this important group belong the largest of existing animals, the whales; also a number of others which man has domesticated and made to serve useful purposes, as the horse, ox, sheep, goat and dog. The distinguishing characteristic of mammals is their development and mode of nourishment during the earliest periods of life. Except among the lowest orders, the young are brought into the world alive and are fed upon the mother's milk. On account of this distinct characteristic of suckling their young the entire group is named *mammalia,* a word from the Latin *mamma,* which means *teat.* Of many interesting habits and characteristics common to the mammalian group, none is more important than the instinct to care for the young. Reaching its highest degree of development in the human species, it takes there the form of love, care and protection for children, making possible the family.

The skin of the majority of mammals is covered with hair of various kinds, ranging from fine wool to coarse bristles, and sometimes spines. The *Cetacea,* however, an order to which whales belong, are almost entirely lacking in hair, the thick skin and coat of blubber beneath it holding the heat within the body, and serving the purpose of a hairy covering. In general structure, the skeleton of mammals conforms to that of man. The cranium is diminished in proportion to the removal of the animal in classification from man.

A distinguishing characteristic of the mammalian skull is that it forms a single piece, composed of bones joined together; the lower jaw unites directly with the skull without the intervention of a connecting bone. The skull is attached to the vertebral column by two projections at the end of the occipital bone. Mammals never have more than four limbs; the front limbs are always present, but the Cetacea and a few other mammals have no hind limbs, or only the rudiments of these. Toothless mammals are found only in the lowest order, represented by the ant-eater (which see). All mammals have warm, red blood, which courses, from a four-chambered heart, through the arteries into all parts of the body, and returns to the lungs to be purified. Air is breathed into the lungs by all animals of this class, including whales and other water-inhabiting mammals. V.L.K.

Consult Osborn's *Age of Mammals in Europe, Asia and North America;* Stone and Cram's *American Animals.*

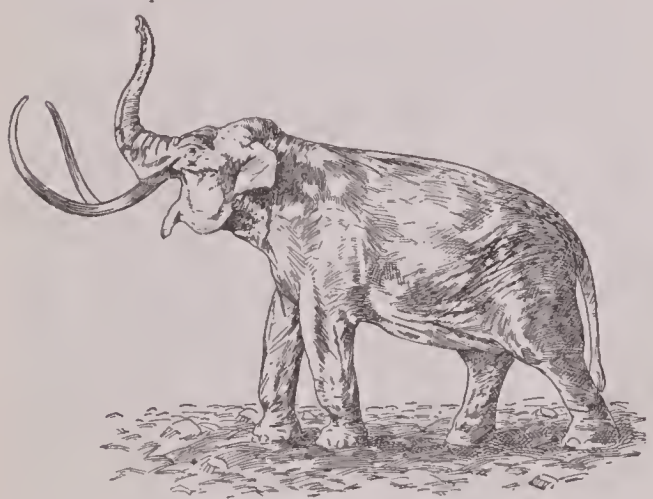
Related Subjects. The mammals which are described in these volumes are listed under their various orders. Thus all the hoofed animals are indexed under UNGULATES, all the pouched animals under MARSUPIALS, and so on. The reader who wishes to make a special study of the mammals has but to consult the following articles:

Carnivorous Animals	Primates
Cetacea	Rodents
Edentata	Ungulates
Marsupials	

The following articles, which cannot be classified under the above headings, may also be consulted:

Bat	Seal
Duck-billed Platypus	Shrew
Hedgehog	Walrus
Mole	

MAMMOTH, *mam'oth,* the best known of the fossil elephants, characteristic of the glacial and postglacial periods. In general form and structure it differs little from the existing Asiatic elephant. Numerous mammoth skeletons have been unearthed in North Siberia and on the Arctic coasts, and they have been found in smaller numbers in Europe and in the United States. Some of the remains found in the Arctic regions have been so perfectly preserved in the frozen soil as to furnish food for the natives. From them we have learned the general appearance and proportions of the animal; it was not so large as is generally supposed, the average size not exceeding that of the present-day elephant. The tusks were long and curved, sometimes spiral, and the hair was heavy and dark brown, and in these respects it possessed characteristics peculiar to itself. One of the largest specimens has been preserved by the Chicago Academy of Sciences.



THE MAMMOTH

From the bones of the animal and other remains which have been found scientists believe the above to be a fairly accurate representation of the prehistoric beast.

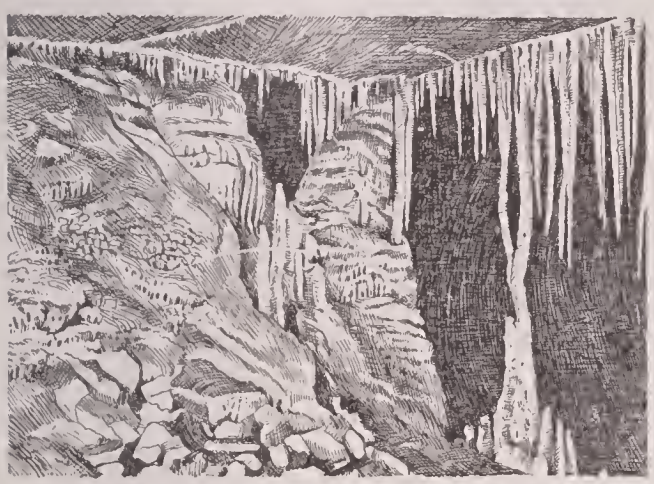
MAMMOTH CAVE. Down in a wild and rocky ravine of the forests in Kentucky, about ninety miles south of Louisville, is a natural arched entrance, seventy feet wide, into a vast underground world, whose winding passages lead into many beautiful chambers with dome-shaped roofs. This huge cavern, known as Mammoth Cave, is the largest of its kind in the world; one may travel over 150 miles through its numerous passageways.

Rain water, laden with carbonic acid from the soil and air, has gradually carved out this wonderful cavern from hard rock by dissolving the limestone and leaving the firmer rocks. During the ages this water, seeping down through many layers, has formed Echo River, an underground stream over three-quarters of a mile long, which empties into Green River. Upon this stream, lying in River Hall, 360 feet below the earth's surface, travelers can board flatboats and be paddled along beneath an arched roof of rare beauty. If one should look down into the clear water at the side of the boat he might see small, white fish darting rapidly about. Other weird creatures, such as small crayfish, wingless grasshoppers, brown beetles and white spiders are found in the damp, lower parts of the cave, but a strange thing about all of them is that they are blind; living in the darkness they have no use for eyes, and Nature does not continue the gift of unused organs. In the winter thousands of bats seek the friendly shelter of the cave, hanging by their feet until spring, but even in summer many of them may be seen flying around the roof.

Ownership. According to local tradition the cave was discovered in 1809 by a hunter named Hutchins; it came into prominence during the War of 1812, when it supplied large quantities of saltpeter used in making powder. Some of the old vats used at that time may still be seen near the entrance. After being bought and sold by various people for its saltpeter deposits, one of the owners finally made the cave a place of exhibition to the public. In 1837, when guides began to conduct occasional visitors, there were so many unusual discoveries that the wonders of the cave attracted attention not only throughout America, but also in Europe. A young physician of Louisville, Dr. John Croghan, became so charmed with its beauty that he bought it in 1839 and subsequently spent large sums in its development. In 1916 a very old man was the only surviving heir; there is a movement on foot to make the whole region, at his death, into a national park.

Various charges, according to the size of the visiting party, are made for the services of the guides; in large parties of twenty-five each one pays a dollar, while in small parties the fee may be three dollars for each person. A picturesque old hotel stands near by for the accommodation of tourists.

A Trip into the Cave. From a frowning ledge above the entrance a cascade of water leaps down, disappearing among the rocks without leaving any sign of a stream. Inside of the cave the air is cool and pure, the temperature



VIOLET CITY IN MAMMOTH CAVE

being about 54° F. in both summer and winter. Soon after passing the old saltpeter vats, the walks expand until the visitor enters the Rotunda, the first great vaulted room of the cave, from which a network of passageways leads off in every direction into vaulted chambers, some of which have wonderful stalactite and stalagmite formations (see STALACTITE AND STALAGMITE). The largest room, Chief City, so named because of the great number of Indian relics found in it, has an area of two acres, and a roof 125 feet high. In this room Indians formerly held their councils. However, the most beautiful section of the cave, Violet City, which was discovered in 1908 and named after the wife of one of the owners, is much smaller than Chief City, being 250 feet long and 125 feet wide, but it contains hundreds of most remarkable stalactites of onyx, varying in size from minute needles to those several feet in length. One group is so attuned that, if struck by some hard substance, the tones resemble those of a chime of bells, and simple tunes can easily be played on them.

In Gothic avenue are other stalactites of remarkable interest, such as those at the Bridal Altar, where four columns eight feet high have formed by the union of stalactites and stalagmites. A place of special interest is Star Chamber, whose ceiling of black manganese is studded with innumerable crystals of snowy gypsum, which resemble stars in the artificial light thrown upon them by the guides. When one realizes that it takes five years to form a deposit the thickness of a wafer upon a stalactite, he finds it almost overwhelming to estimate the number of centuries during which this natural wonder of the world has been forming. E.C.

Consult Hovey's *Mammoth Cave of Kentucky*, and his *Celebrated American Caverns*.

MAN, the most highly-organized animal in the scale of nature, belongs to the first order of mammalia (see MAMMALS). This order is called *primates* (from the Latin *primus,* meaning *first*). Man is superior to all other animals particularly in that he has a reasoning mind and in that he speaks an intelligible language with which he can impart his thoughts readily. These powers are not possessed by any other animal. This highest group of animals includes, besides man, apes and monkeys. In mentality, man ranks far above gorillas, chimpanzees and orang-utans, the highest order of apes. Physically, man differs from other animals of the same class in that he walks erect; the feet are not adapted to grasping or seizing, the teeth are close together, and the bones of the face project downward rather than outward and are below the brain. The most marked difference, however, is the larger cranial capacity and the much greater volume of the human brain.

Evolution of Man. Excavations made in caverns in England and on the continent of Europe show distinct traces of man which give him claim to a race history covering many thousands of years. Stone implements have been found with but little variety of form, rudely chipped into shape and neither ground nor polished. Those of a later period are polished or ground to a sharp edge. These objects belong to the Stone Age, and scientists have been able to form a fairly clear idea of man's mode of life and progress from these deposits. It is supposed that the race of man has existed since the Glacial Period (which see), but how long before the Glacial Period mankind lived, and how the race originated and became distributed over the earth, are questions which scientists have been unable to answer. The Darwinian theory is that all present races originated from one parent stock and that man is the direct descendant of some form of anthropoid (resembling man) ape (see EVOLUTION). Some who accept the Darwinian theory believe that the Creator especially endowed the hu-

man race with a soul. Others think that the human race developed from separate sources and refuse to believe in a mind and soul of divine origin. For man's conquest of the earth see Civilization. See, also, Races of Men.

MAN, Isle of, an island of the Irish Sea inhabited by Celtic people whose customs and history have been vividly presented in the writings of Hall Caine. This popular English novelist resides at Greeba Castle, one of the in-

LOCATION MAP

teresting features of the island. The Isle of Man lies midway between England and Ireland and fifteen miles south of Scotland. Its name comes from the Manx word *Mannin,* meaning *the middle.* It has an area of 227 square miles, and its coastal scenery is bold and picturesque. A mountain chain extends nearly its entire length; the highest point is Snaefell, 2,034 feet above sea level. Lead and zinc are mined extensively, and silver is found in considerable quantities. Fishing and agriculture are important industries.

The principal towns are Douglas, the capital and chief seaport, Castletown, Peel and Ramsay. A fine fleet of swift steamers affords communication between Douglas and Liverpool. Among the ruins of interest are the Castle Rushen, founded in 947 and the most perfect building of its date now existing; Peel Castle, dating from the twelfth century; numerous relics of the Druids (which see), and Runic monuments throughout the island (see Runes).

The island, inhabited chiefly by the Manx, a people of Celtic origin, was purchased by the British government early in the nineteenth century. It has a constitution and government of its own, and to a certain extent is independent of the imperial government, although it is ruled by a Lieutenant-Governor appointed by the English Crown. The legislative authority rests with the Legislative Council and the House of Keys, or Representatives. The native Manx tongue is still spoken in the northwestern parishes and along the west coast, and it is taught, with English, in the parish schools. Population, about 52,000.

MANÄOS, *mah nah' ohs,* the capital of the state of Amazonas, in Brazil, a city of nearly 80,000 people in 1917, is situated on the north bank of the Rio Negro, twelve miles above its junction with the Amazon, far up the course of that mighty river, in the maze of woods and streams. It is one of the marvels of modern city building, "more cosmopolitan than Para," and "essentially an American city." It is 908 miles by river from the Atlantic Ocean, 850 miles from Belem (Para) by the shortest route, about 3,800 miles from New York and about 5,000 miles from London. The city is in latitude 30° south, 106 feet above the sea level. The great variation of the river level, with its seasonal rise and fall of thirty-three feet, necessitates floating docks and bridges. Manäos has electric lights and cars and good waterworks. Its customhouse, municipal hall, botanical garden, museum, public library, theater, etc., tell of lavish expense, civic pride and modern spirit. Public elementary schools are provided; there are good private schools, and a lyceum for secondary instruction.

The first small settlement of white men began here in 1660, the place being called São José de Rio Negro and later Barra do Rio Negro (referring to the river bar). This insignificant village rose in 1850 to be the seat of the wild territory of Amazonas and at that time took its present name. Two years later a navigation company was organized, and in 1853 regular commerce began. The recent and remarkable story of Manäos starts with 1878, when the export tax on direct shipments was lowered.

MANATEE, *man a te',* or **SEA COW,** a large, seal-like animal which is supposed to have suggested the mermaid to the primitive mind (see Mermaid). It is native along the coasts of South America, Australia and Africa, and frequents lagoons and the estuaries of rivers, browsing on aquatic plants, among which it often stands upright on the curve of its tail. The manatee is an ungainly animal, from eight to ten feet in length and without hind legs, but

it is equipped with forelegs modified into swimming paws. Its skin is tough, like that of an elephant, grayish-black in color and sparsely

THE MANATEE

provided with bristles. Its upper lip, which is cleft, closes on the weeds and water grasses like a pair of pliers. The animal has been much hunted for its flesh and oil.

MAN'CHESTER, one of the three great English industrial cities, and the center of the most extensive manufacturing district in the world. Although cotton goods are the chief articles of manufacture, about 700 other industries are represented there. In recent years many of the mills and workshops have been removed to the populous suburban sites, so the center of Manchester and an ever-widening circle around it are now devoted not so much to production as to the distribution of its manufactures to every part of the civilized world; for the enterprise of its merchants has kept pace with the energy of its manufactures. In the heart of the city are many fine warehouses and shops, and prosperity was evident everywhere, before the outbreak of the War of the Nations. That struggle affected the city as it did the entire kingdom.

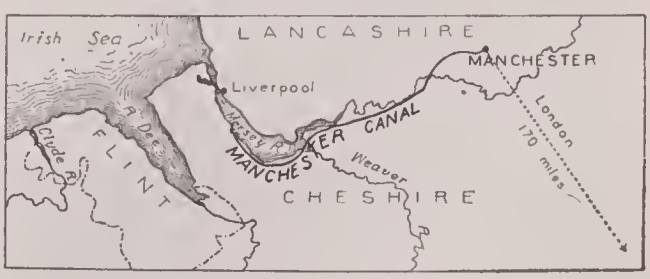
Manchester is a corporate parliamentary borough of Lancashire, on the Irwell River, thirty-two miles northeast of Liverpool. On the west bank of the Irwell is Salford, connected with Manchester by sixteen bridges, so that the two boroughs are virtually one city. Canals and railways radiate from the center of Manchester in all directions. The Manchester Ship Canal (see below) connects the city with the estuary of the Mersey River, at Eastham.

The city is proud of its many fine public buildings. The town hall, or municipal building, in Gothic architecture, is one of the finest of the modern buildings in England; its clock tower, 286 feet high, contains a chime of twenty-one bells. Other edifices of note are the Royal Exchange, the Assize Courts, and the Royal Institution containing a gallery of paintings, a school of design and a lecture theater. None of the large cities of the British Isles is better furnished with fine libraries and reading rooms, and the facilities for education have been greatly extended and improved within recent years. The Victoria University is of high character; it has an excellent library and a museum of natural history.

The most notable public institution is Chetham's Hospital, founded under the will of Humphrey Chetham for the education of poor boys. Its library, which was the first free library in Europe, contains over 40,000 volumes. Chief among the many fine statues and monuments which grace the city is the Albert Memorial, in Albert Square, facing the town hall. The sanitary condition is far from satisfactory, and vigorous efforts are constantly being put forth to remedy this unfortunate condition, which is caused by the smoke nuisance and the disease-bearing Irwell, which flows through a densely-populated part of the city.

The history of Manchester is legendary down to the tenth century, when the town was devastated by the Danes. In the twelfth and thirteenth centuries the woolen manufacture began to develop. Since the introduction of cotton-spinning machinery, toward the close of the eighteenth century, the city's progress has been rapid. It is represented in Parliament by six members, and Salford by three members. Population in 1911, 714,330; of Salford, 231,380.

Manchester Ship Canal, an English canal that converted the inland town of Manchester into a seaport, and which has enormously increased industrial and commercial activity. It extends from Manchester to the Mersey estuary at Eastham, six miles above Liverpool.



MANCHESTER SHIP CANAL

The canal is 35.5 miles long, about 840 feet wide and twenty-six feet in depth. It was ready for traffic in January, 1894, the official

opening ceremony taking place on May 21, when Queen Victoria visited Manchester. It is in direct communication with all the barge canals of the kingdom, and through it the largest seagoing boats enter the heart of the city, which has six miles of wharfage and 100 acres of dock accommodations. The cost of construction was $75,000,000, and the annual traffic receipts now amount to over $3,000,000.

MANCHESTER, N. H., the largest city of the state, and its most important manufacturing center. It is one of the county seats of Hillsboro County, and is situated in the southeastern part of the state, and is on the Merrimac River, at the point where it receives the Piscataquog River. Concord, the state capital, is seventeen miles north, and Boston is fifty-six miles south. Railroad transportation is provided by the Boston & Maine; interurban lines extend from the city to neighboring towns. Population, 1910, 70,063; in 1916 (Federal estimate) 78,283. The area of the city is about thirty-one square miles.

Location. The city occupies both banks of the two rivers, at an elevation of ninety feet above the water, and commands a fine view of river and valley. Lake Massabesic lies on the east side of the city. The park reservation of 200 acres is divided into fifteen parks. A noticeable feature of Manchester is the pleasing aspect of the residential district of the industrial classes, the rule being detached dwellings and corporation homes, instead of tenements.

Buildings and Institutions. Manchester has a number of fine buildings, the most conspicuous being the Federal building, the county courthouse, the Roman Catholic Cathedral and the public library, containing about 46,000 volumes. Notre Dame, Sacred Heart and Elliott hospitals, Saint Joseph's and Saint Patrick's orphanages, and Saint Vincent's and Saint Patrick's homes for the aged are worthy of note. Besides the public and parochial schools, there are Saint Mary's Academy, Saint Anselm's College, Saint Augustine's Academy and the state industrial school.

Manufactures. Above the city the Merrimac River has a drop of fifty-four feet, called the Amoskeag Falls, which furnishes abundant water power for manufacturing purposes; to these falls the city owes much of its prosperity. Large capital is invested in the manufacture of cotton goods, the city's chief product. The thirty-six cotton mills have a total annual output of 246,000,000 yards, and with the woolen mills employ about 15,000 people. Boots and shoes are also important products, about 7,500 people being employed in their manufacture. The annual value of these and lesser products is estimated at $46,000,000.

History. The first settlement by white men on the site of Manchester was made in 1722 by Scotch-Irish immigrants. For a number of years it was known as Harrytown, and with portions of Chester and Londonderry was incorporated as the township of Derryfield in 1751. In 1810 the name was changed to Manchester on account of its manufacturing possibilities, and in 1846 the city charter was granted. In 1853 the villages of Amoskeag and Piscataquog were included within the city's limits. Manchester is the birthplace and burial place of the fearless military leader, General John Stark, and in the park overlooking the Merrimac River a monument has been erected to his memory. J.F.S.

MANCHURIA, *man choo' re ah,* a province of about 363,600 square miles, in Northeastern China, the original home of the Manchu, who established the Ta Ching or "Great Pure" dynasty which reigned in Peking from 1644 to 1912. The Chinese were made by the Manchus to wear the *queue* as a symbol of subjection, but it came in time to be regarded as an essential part of dress. At the present time the population of 17,000,000 is largely Chinese, and the country is politically a dependency of China. The foreign relations of Manchuria are entirely in the control of the central Chinese government at Peking, and the local affairs of the three divisions of the province are in the hands of provincial governors.

Manchuria is a land of the richest natural resources, but only about one-fifth of its land is under cultivation. The country is very mountainous, the melting snows of the Shan-a-lin, or Long White Mountains, feeding the large rivers which water immense crops and furnish a means of carrying them to market. These mountains, rich in coal, gold, silver, copper, lead, iron and soda, are covered by extensive and valuable forests of pine, oak, elm and walnut. The Fushun coal mine, operated by the government, is believed to be one of the largest in the world. There are many hunters and trappers in the mountains, who collect great quantities of skins of tigers, bears, wolves, deer, foxes and martens. West of the Shan-a-lin range lies a great fertile plain, where immense crops of beans, peas, rice, tobacco and Kaoliang are raised. Kaoliang, raised for home use, is a grain, eaten by the Chinese as a cheap substi-

tute for rice; the stalks are used as building material and fuel, and the leaves are made into hats, baskets and brooms.

There are three important railroads in Manchuria, but these, with the country roads which are very crude and sometimes impassable, cannot take all of the crops to the markets, so the boats and junks in summer and the ice sledges in winter carry great loads down to the big cities on or near the coast.

The treaty after the Chinese-Japanese War (which see) in 1894-1895 gave Japan Port Arthur and one other important port. Russia, France and Germany interfered and forced Japan to give up this concession, for which service Russia obtained a twenty-five year lease of the port and other important privileges. During the Boxer uprising in 1900, Russia sent troops into Manchuria, which were not withdrawn, and the Russo-Japanese War resulted. The Treaty of Portsmouth at the close of the war transferred to Japan this Russian lease of the Liaotung Peninsula, which expires in 1923, when it and the other rights granted Russia will revert to China. See Russo-Japanese War.

Buddhism is the popular religion of Manchuria. In spite of the great natural wealth of the country, the people live in terrible poverty and ignorance. Y.T.T.

For location, see colored map, in article Asia. Consult Hosie's *Manchuria, Its People, Resources and Recent History.*

MANDALAY, *man'da lay,* a picturesque city of India founded in 1860, which has been the capital of Upper Burma since the British conquest of the country in 1885; for twenty-five years previous it was the ruling city of the independent kingdom of Burma. It is situated on the left bank of the Irrawaddy River, 350 miles north of Rangoon, with which it is connected by rail. In 1892 a disastrous fire destroyed nearly the whole of the city, so many of the buildings are of modern construction, while the fine, shady streets are well lighted. In the center of the city, which covers an area of six square miles, is a quaint walled town, now called Fort Dufferin and used as a British cantonment, or military station. Within the wall are the royal palaces, made chiefly of teakwood, the government house and the hall of justice. On the outskirts of the city there are numerous monasteries, temples and pagodas, the most famous being the Aracan Pagoda, containing a brazen image of Buddha twelve feet high. Silk-weaving is the most important industry of the 138,300 inhabitants.

Kipling has immortalized the city in his poem *Mandalay,* the opening stanza of which follows:

By the old Moulmein Pagoda, lookin' eastward to the sea,
There's a Burma girl a-settin' and I know she thinks o' me;
For the wind is in the palm-trees, and the temple bells they say:
"Come you back, you British soldier, come you back to Mandalay!"

MANDAMUS, *man da'mus,* a Latin word meaning *we command,* is a term in law applied to a writ issued by a superior court to compel an inferior court, official, corporation or individual to perform a public duty definitely prescribed by law. The writ of mandamus is issued only when the ordinary channels of legal procedure are closed to the parties injured by the neglect of duty; its purpose is to secure justice and to prevent disorder in the absence of other legal remedies. For instance, the taxpayers of municipality may petition the proper court to direct a writ of mandamus to the mayor requiring him to close the saloons on Sunday if the law specifically forbids liquor-selling on that day. If the matter in question is one in which the performance of duty is left to the discretion of the official the writ of mandamus cannot be used as a remedy. That is, the duty must be clear and unquestioned, not a matter of judgment. See Writ; Injunction.

MAN'DAN, a tribe of vigorous, interesting Indians of Siouan stock, who have been almost wiped out by epidemics of smallpox and by raids by the Sioux. Only about 200 yet remain, and they live on the Fort Berthold Reservation in Western North Dakota. Little is known of their early history except that they were gradually crowded north along the Missouri River, and finally, in 1837, were reduced to one village on the Knife River. In 1870 they were living near the mouth of the Heart River, a tributary of the Missouri. Their houses, built of logs, were low and circular, roofed and chinked with mud and grasses. Great herds of buffalo on the plains supplied them with meat and warm robes for the long, cold winters. The crudely-dressed hides, when stretched between posts, made comfortable beds; placed over willow frames, they formed queer, tub-like canoes. The Mandans raised beans, corn, sunflowers and tobacco.

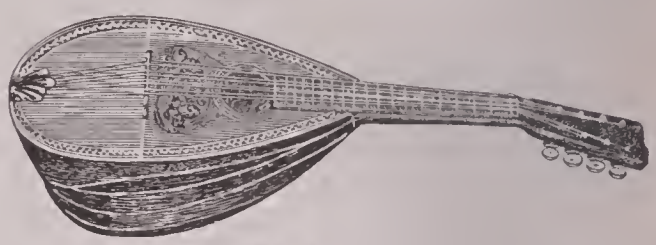
MANDARIN, *man'da rin,* the English name applied to high officials of China, military, judicial and civil, before the republic was estab-

lished. The Chinese equivalent is *kwan,* meaning *a public character.* Mandarins were of different rank, and their relative positions were denoted by the color of the buttons on their ornamental caps. Governors and generals displayed buttons of red coral; lieutenant-governors and judges, blue stones; lower officers, white, crystal and yellow. Each mandarin wore an official robe; that of the military man being embroidered with representations of beasts; that of the civil officer, with birds; the judicial robe was plainer. By law a Chinaman could become a mandarin by promotional examinations. One could not hold the position of mandarin in his native province, could not marry in the province to which he was assigned, and could not acquire property in it. Tenure of office in one province was not longer than three years.

MANDEVILLE, *man'de vil,* Sir John de, traditional author of a fourteenth-century book of travels, whose marvels have delighted many a reader. The narrator gives what purports to be an account of his wanderings in Turkey, Arabia, Egypt, India, the Holy Land, and other parts of the East. In reality the book is a compilation based upon a book of travels by William of Boldensele (1336), the journal of Friar Odoric of Pordenone (1330), and other medieval writings. The book appeared originally in French, and there are three English versions extant. According to best authority, the real author of the travels was one John of Burgoyne, who died at Liége in 1372.

MANDINGO, *man ding'go,* a West African group of negroes, who live in the region extending from the Senegal and Upper Niger rivers to Monrovia, on the coast of Liberia. They number several millions and are divided into very numerous tribes, each of which has its own dialect. The Mandingo, who were brought to an acceptance of the doctrines of Mohammed many centuries ago, have advanced far from their original state of savagery—their food, dress and homes being those of a civilized people. They are lean and athletic in build; their skin varies from olive to black, and their features often show a marked departure from the ordinary negro type.

MANDOLIN, *man'doh lin,* a musical instrument of the same general character as the lute, and like the latter, an instrument of great antiquity. It has from four to six double strings, is gourd-shaped, and terminates in a neck fitted with many frets. It is played with a plectrum, or pick, of tortoise shell, whalebone, or other flexible material, which is held between the thumb and first finger of the right hand. A long note is produced by rapid, successive strokes on a double string, the tone produced having a peculiar tremulous quality. The mandolin is of Italian origin, the chief varieties being the Neapolitan with four double strings,



MANDOLIN

and the Milanese with five. Though it has never been a regular orchestral instrument, music for the mandolin has occasionally been introduced into operatic scores as an accompaniment for serenades. A notable example is the music for the celebrated serenade in Mozart's *Don Juan.* See Lute.

MAN'DRAKE, a genus of plants with broad leaves and bright-yellow flowers. For many years the root was employed in medicine, and

THE MANDRAKE, OR MAY APPLE
Above, a bud and cross section of flower.

has long been an object of much superstition among ignorant people. According to an old and strange fancy the mandrake shrieks when pulled from the ground, and if properly consulted as an oracle brings good luck to the

household. Shakespeare in *Romeo and Juliet* says in Juliet's farewell:

And shrieks like mandrakes torn out of the earth
That living mortals hearing them, run mad.

It is a native of Southern Europe, and the name is derived from the peculiar shape of the forked root, which supposedly grew in half-human form. In ancient times the root was used as a narcotic and anesthetic and in "love potions."

In the United States and Canada the *may apple,* a species of plant of the barberry family, is often called the mandrake. See MAY APPLE.

MANDRILL, *man'dril,* a species of ferocious baboon, which nature has made so repulsive that it is said to be the most hideous of all living animals. It inhabits Guinea and other portions of West Africa, where the natives regard it with extreme dislike because of the damage it does to crops. The mandrill grows to great size, has a doglike muzzle, eyes like a pig, and a misshapen nose. The high cheeks are colored a cobalt blue, and are scarred with scarlet furrows; patches of red appear also on the lower parts of the body. These animals live in groups, and like all baboons, they walk on all fours. If kept in captivity until full grown they become very savage, and even the young show few agreeable traits. See APE; MONKEY; BABOON.

MANGANESE, *man'ga neese,* an extremely hard, grayish-white metal, of little value itself, but of great importance in the steel industry. The grade of steel depends on the amount of manganese, the manganese greatly increasing its elasticity and hardness. Alloyed with copper and zinc, it forms manganese bronze of many uses. Other compounds of the metal are important in the manufacture of flint glass, dry batteries and pottery. Its use in the manufacture of chemicals is decreasing. It occurs in nature in iron, silver and lead ores, and in many mineral waters, cereals and vegetables used for food. The most abundant deposits are found in Southern Russia, Brazil and in the United States in the Piedmont Mountains of Virginia and Georgia. As the mineral pyrolusite it was known by the Roman writer Pliny, who thought it to be an iron ore. The name manganese was given it in 1808.

MANGE, *maynj,* a disease of the skin resembling itch, affecting horses, dogs, cattle, and sheep. It is caused by a tiny parasite, which makes its way under the skin and lives in the hair follicles. The body soon becomes spotted with pimples and scabs, which itch and cause the victim to suffer great discomfort. To cure the disease the microbe must be destroyed, and the most successful way of doing this is by plunging the victim into a tank or tub containing an antiseptic solution, containing such substances as lime and sulphur, carbolic acid or tobacco. Poisonous preparations of mercury and arsenic should not be used. Mange is contagious, and requires care to prevent its spread. Various kinds of skin disease are often confused with it.

MANGO, *mang'go,* from a Malay word meaning *tree fruit,* is a kind of evergreen tree native to India and the Malay Peninsula, distinguished by its luscious fruit. The mango is a tree of rapid growth, attaining a height of about forty feet and crowned with a dense foliage of lustrous, tapering leaves from six to eight inches in length. The flowers are reddish-white or yellow in color. When the tree is cultivated, the smooth kidney-shaped fruit often weighs a pound or more. Different varieties range in size from that of a plum to that of an apple. The fruit is sweet or slightly acid in flavor, and is highly prized as a dessert. The kernel, too, is nourishing and is eaten roasted

HOW MANGOES GROW

by the natives when food is scarce. The unripe fruit is used for pickles, sauces, etc. Mangoes grow so profusely and so continuously in the West India islands, where the season is eight months long, that their production has tended to make the natives indolent and nonprogressive. One may live there without working.

The fruit is therefore not an unmixed blessing to the West Indians.

Introduced into Jamaica in 1782, the cultivation of the plant was extended throughout the West Indies and to Southern Florida and California. The mango is propagated either from seed or by grafting. In Florida, eight-year-old trees sometimes bear 5,000 fruits a season. The fruit is found in Northern markets in August and September.

MANGROVE, *mang'grohv,* a genus of shrubs or trees which spread thickly and abound on the shores of lakes and rivers in all tropical

THE MANGROVE

countries. The name is derived from the Malay word *manggi-manggi,* and is sometimes written *mangrowe.* These trees have the remarkable habit of throwing out roots in all downward directions on the lower part of the trunk, and these take root along the muddy shore. By this means the mangrove spreads in monotonous green thickets, sometimes for hundreds of miles; at their roots new soil is slowly formed from mud brought in by the waves and from falling leaves, etc., and in time even islands of considerable size may appear. The red mangrove is found along the coasts of Florida, Lower California and Mexico. It is a round-topped tree, about twenty-five feet high, with thick, oval leaves and the drooping roots referred to; in the last respect it is somewhat like the banyan tree, although the latter grows in firm soil. The fruit is sweet, and a wine is made from it; the wood is used for fuel and wharf piles, and can be given a high polish. The astringent bark is used in tanning.

MANHATTAN, *man hat'an,* **ISLAND,** an island at the head of New York Bay, thirteen and one-half miles long and two and one-half miles broad at the widest part, covering an area of twenty-two square miles. It is now coextensive with the main residence portion and the commercial and financial center of New York City. The first Dutch Governor-General, Peter Minuit, acquired this island from the Indians in 1622 for the sum of $24 in merchandise; it then contained 200 people, living in thirty-one log houses with bark roofs. The ground value of the island to-day is upward of three billion dollars.

The history of Manhattan Island since this memorable purchase is told under the heading New York City.

MANILA, *ma nil'a,* in Spanish *mah ne'la,* the capital of the Philippine Islands, situated on the western coast of the island of Luzon, at the head of Manila Bay. It is divided into two portions by the little River Pasig, on the south bank of which stands the sleepy old town, founded in 1571, surrounded by walls still in good condition and forming one of the best existing models of a walled town of the period. Within the wall are grouped the cathedral, the archbishop's palace, numerous churches and monasteries, the government building and many old-time Spanish houses. On the north bank are the modern suburbs, and the commercial and native quarters. The palace of the Governor-General is in the riverside suburb of Malacañan. Since the United States has taken control, it has introduced a modern system of sewage disposal and brought down from the mountains east of the city a supply of pure water. The mouth of the Pasig has been deepened so as to admit ocean-going vessels of moderate draft. The largest transpacific liners come directly to the new piers in the magnificent new harbor created by Uncle Sam.

LOCATION MAP
The small corner map pictures the entire island of Luzon.

Manila was the first city of the Philippines to develop town-planning on systematic lines. Recently the old city walls together with the surrounding moats (which have been filled in) have been made a part of the park system.

Among the new buildings, the most notable are the Manila Hotel, the Army and Navy Club, Elks Club, Episcopal Cathedral, the General Hospital, the normal school and the Y. M. C. A. The famous Jesuit Observatory stands in a garden on the outskirts of the city. Near it rise the new buildings of the university. The native houses are generally constructed of bamboo and thatched with leaves of the nipa palm. Instead of glass for windows, a flat shell of a large oyster is substituted, and the window-frames all slide horizontally. The shells admit a soft light and exclude the great heat. Since 1913 the city and its suburbs have been lighted by electricity.

The manufacture of cigars, which gives employment to thousands of men, women and children, is the most important industry. Manila also manufactures malt and distilled liquors, cotton fabrics, clothing, foundry and machine-shop products, wagons, furniture and boots and shoes. The city is the greatest hemp market in the world; about 175,000 tons are exported from the Philippines each year, nearly all of which is shipped from Manila. The imports consist chiefly of rice, cotton goods, chemicals, machinery, metal goods and wine, and trade is carried on chiefly with China, the United States and Great Britain. Hemp, sugar, tobacco, coffee and dyewoods are leading articles of export.

Manila was founded by Legaspi, the conqueror of the Philippine Islands, in 1571. It suffered severely by the earthquake of 1863. The Spaniards surrendered Manila to the American naval and military forces August 13, 1898 (see SPANISH-AMERICAN WAR). At that time the Philippine insurgents were surrounding the city. In the early part of 1899 they broke through the American lines which invested the city and burned a small portion of the native quarter. In August, 1901, the military government gave place to the new civil rule. Manila was one of the first of the Philippine cities to adopt the commission form of municipal government. The commission which governs the city has six members, four of whom are appointed by the Governor-General; two natives are elected by popular vote. Under this form of jurisdiction Manila has been able to make rapid progress in practical, sanitary and esthetic development. Population, 1914, 266,940; of this number, 236,940 were Filipinos. E.B.H.

MANILA HEMP, the fiber of a species of plantain used extensively in rope-making. See HEMP.

MANILA BAY, BATTLE OF, a naval battle of the Spanish-American War, the first important engagement of that conflict. It was fought in the Bay of Manila, in the Philippine Islands, May 1, 1898, between an American fleet under Commodore (later Admiral) George Dewey, and a Spanish fleet of about equal strength under Admiral Montojo, the latter supported by land batteries. The American fleet, which at the declaration of war was in Chinese waters, had proceeded to the Philippine Islands and had entered the harbor of Manila during the night of April 30. The following morning Commodore Dewey attacked the Spanish fleet, and in a battle lasting several hours, ten Spanish ships were sunk or destroyed and over 600 Spanish sailors were killed or wounded. The Americans did not lose a ship or a man, and only six were wounded. Dewey was soon reënforced by land troops under General Merritt, and on August 13 the city of Manila was taken. Thus the Philippine Islands, which had been held by the Spanish since the days of Magellan, came into the possession of the United States. See PHILIPPINE ISLANDS; SPANISH-AMERICAN WAR.

MANISTEE, *man is te'*, MICH., the county seat of Manistee County, is noted for its immense product of salt and sawed lumber, especially shingles, in which it surpasses any other city in the United States. Poles and Scandinavians comprise the foreign element of the population, which in 1910 was 12,381. Manistee is situated on Lake Michigan, at the mouth of the Manistee River, about midway between the northern and southern borders of the state, thirty miles north of Ludington and 110 miles northwest of Grand Rapids. Chicago is 180 miles southwest by water. The city has fine transportation facilities, through regular steamship service and the Flint & Pere Marquette, Manistee & North Eastern, and Michigan East & West railroads. In 1840 the first settlement was made by John and Joseph Stronoch; in 1869 it became a city, and in 1914 the commission form of government was adopted. Heavy losses were sustained by fire in 1861 and in 1871. The area is a little less than three square miles.

Manistee is an important shipping point on Lake Michigan. It has a good harbor, and the Manistee River, its outlet, is usually free from ice in winter. About two and a half million barrels of salt are shipped from here annually, and also many millions of feet of sawed lumber. Underlying this locality at a depth exceeding 1,900 feet is a stratum of rock salt

thirty-two feet thick, and the brine is pumped through openings not more than six inches in diameter.

Besides the large salt and lumber industries, the city manufactures furniture, sole leather and foundry products. The most notable buildings are the $80,000 Federal building, an opera house, a $50,000 Carnegie Library, the Masonic Temple, the Elks' Temple and a fine courthouse. Features of interest in the vicinity are Orchard Beach, a lake resort, with a theater, and the Vacuum Pan Salt Works at Eastlake, a suburb, said to be the largest salt enterprise in the world. H.S.C.

MANITO'BA, the most easterly of the western provinces of Canada, is situated in the geographic center of the land mass of North America, being about equally distant from the Atlantic and Pacific Oceans and the Arctic Ocean and the Gulf of Mexico. It is often considered to be the gateway to the great Canadian Northwest. The name comes from two Indian words, *manito,* meaning the *great spirit,* and *waban,* meaning *the narrows,* the name especially applied to the narrow part of Lake Manitoba. The wind, when rushing through the Narrows, makes a peculiar sound; the early Indians believed this to be the voice of God, so they named the place *Manito-Waban,* or the *narrows of the great spirit.* The name was changed to *Manitoba* by the early settlers.

The province extends 300 miles along the northern boundary of the United States, bordering a part of Minnesota and North Dakota. It extends northward to the 60th parallel of north latitude; the line separating it from Saskatchewan on the west is 770 miles long, or nearly twice the length of Illinois. Ontario bounds it on the east, and the northeast corner for more than 300 miles is washed by the waters of Hudson Bay. The area of the province is 251,832 square miles, of which 19,906 square miles are water. It is about the size of Alberta or Saskatchewan.

Previous to 1912 the form of Manitoba was that of a square, and the area was a little less than 74,000 square miles (see map, in illustrations, page 3629). In that year the Dominion government divided the territory of Keewatin between Manitoba and Ontario, extending the boundaries of the province to their present limits. The addition is sometimes referred to as New Manitoba. Manitoba is larger than any state in the American Union except Texas. It is a little more than three times the size of Minnesota and a little larger than Montana and Colorado combined. Excluding the provinces of Bosnia and Herzegovina, Austria-Hungary could be placed in Manitoba with 10,000 square miles to spare.

The People. There were but few white inhabitants in Manitoba previous to 1870. Since that date the population has increased rapidly, and in 1911 the province had a population of 455,614, an average of 6.18 inhabitants to the square mile. Since the census was taken a large number of immigrants have entered the province. Most of the older inhabitants are of English and Scotch descent, but recent immigration has added a number of nationalities from Central and Southern Europe. In 1915 there were 11,000 Indians in the province.

Religion. The population of Manitoba is more evenly distributed among the leading religious bodies than in some of the older provinces. The leading denominations in the order of their membership are Presbyterian, Anglican (Episcopalian), Baptist, Roman Catholic, Methodist, Lutheran and the Greek Church. A number of other denominations are represented, but their membership is relatively small.

Surface and Drainage. The eastern part of Manitoba belongs to the Laurentian Plateau and has a rocky, uneven surface, but no mountains or high hills. It is well wooded and contains numerous lakes. The remainder of the province is a portion of the Great Plain of North America. The southern and central portions are believed to be a part of the bed of a

great lake that in some past geological age covered all this region, and which geologists call Lake Agassiz. This region is level and is a continuation of the great valley of the Red River of the North, which has its origin in Minnesota. West of this valley the surface consists of rolling prairie that increases slightly in elevation as it approaches the western boundary where the higher elevations are known as the Riding and Duck mountains. This ridge has an elevation of about 500 feet where it enters the province from North Dakota.

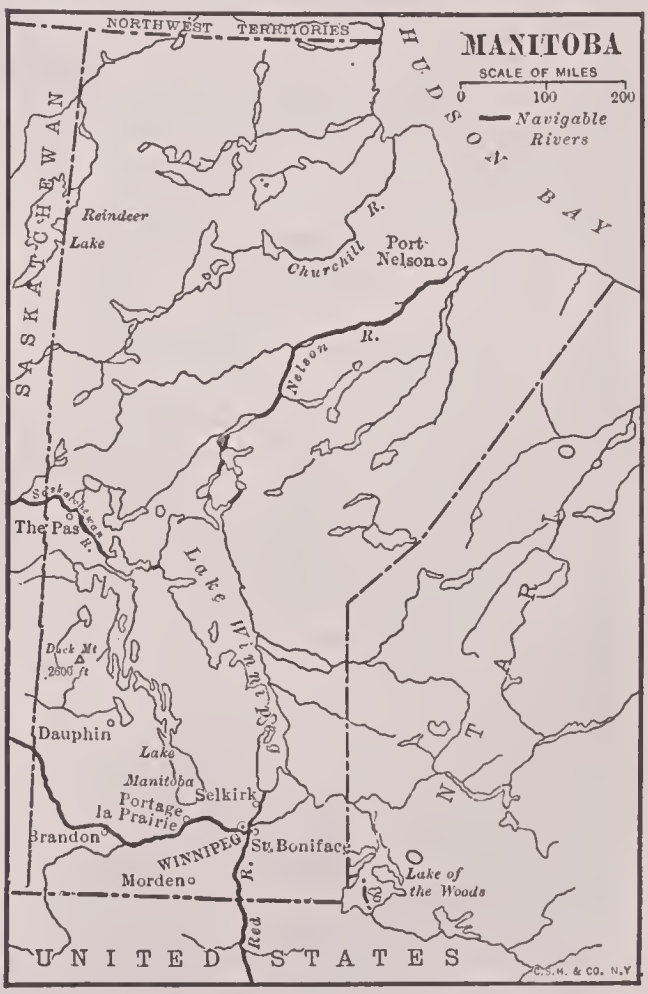
LOCATION MAP
Showing, also, the size of Manitoba as compared with the whole Dominion.

Lakes and Rivers. Manitoba has three large lakes and many small ones. Lake Winnipeg, situated in the east-central part of the old province, is the largest. Next in size is Lake Winnipegosis, 150 miles long and 2,086 square miles in area. Lake Manitoba, south of Lake Winnipegosis, is 135 miles long and has an area of 1,817 square miles. These lakes lie west of Lake Winnipeg. The shores are low, and the waters are murky, owing to the silt discharged by the inflowing streams. The smaller lakes are scattered over the province.

The drainage of the province is towards the northeast, into Hudson Bay. The most important stream is the Red River of the North, which crosses the international boundary on a line separating Minnesota from North Dakota and flows into Lake Winnipeg. The Assiniboine, its chief tributary, traverses the province from west to east and joins the Red River near Winnipeg. The greatest river flowing eastward from the Rocky Mountains—the Saskatchewan—falls into Lake Winnipeg on its western side, in Manitoba. Winnipeg River, the outlet of the Lake of the Woods (which see), flows into Lake Winnipeg and drains the southeastern part of the province. The Nelson River drains Lake Winnipeg into Hudson Bay. Other important streams flowing into this body of water are the Hayes in the eastern part of the province and the Churchill in the northern part. Many of the smaller streams furnish water power which is available for operating mills and electric plants.

Climate. The winters are long and cold, the thermometer sometimes registering 40° or 45° below zero, but the atmosphere is dry and clear, and the severity of the temperature is not noticed as much as it is in a more humid atmosphere. The summers are short, but many warm days are experienced. The high latitude gives this region many hours of sunlight, and vegetation grows with wonderful rapidity. The mean annual temperature is 33° F., with extremes of 40° to 50° below zero to 95° above. The change from winter to spring and summer is very rapid, and frequently an April that is wintry at the beginning ends with conditions approaching summer. The mean annual rainfall is 17.43 inches, but three-fourths of it occurs during the growing season, so there is ample moisture for agriculture. The ground is usually covered with snow from December to March.

Plants and Animals. The eastern and northern parts of the province contain forests of



OUTLINE MAP OF MANITOBA
Showing the boundaries of the province, navigable rivers, lakes, principal cities, and the highest point of land.

spruce, jack pine and tamarack, but in the southern and central prairie regions trees are found only along the banks of streams or around lakes. In the western part of the province, however, belts of timber land varying from a

few hundred yards to ten miles in width are met. These belts contain elm, oak, the ash-leaved maple and the aspen or poplar, and some spruce. In the spring the unbroken prairies are covered with wild flowers, and in most places trees and shrubs grow readily about the home.

In the northern part of the province fur-bearing animals are abundant, and the hunter and trapper receives good remuneration for his time and skill. Minks, muskrats and martens are caught in large numbers. Moose, deer, elk and reindeer or caribou are found in the unsettled regions, and during the summer duck, grouse, plover and woodcock are numerous. Many migratory birds following the Mississippi pass by the Red River and Lake Winnipeg to their northern breeding grounds.

Minerals and Mining. Deposits of iron ore are found on the shore of Lake Winnipeg, and soft coal is found in the southwestern part of the province, but neither is extensively mined. There is an abundance of limestone for building purposes, beds of clay suitable for making brick of excellent quality occur in several parts of the province, and north of Lake Saint Martin are deposits of gypsum which furnish raw material for the manufacture of wall plaster and plaster of Paris. One-third of the gypsum produced in the Dominion is taken from these beds.

Fisheries. The lakes and the shore waters of Hudson Bay abound in fish; large quantities of whitefish, pickerel, pike and trout are taken. The annual catch amounts to about $850,000, much of which is shipped to Chicago. The industry gives employment to about 2,000 people.

Forests and Lumbering. In the southwestern part of Manitoba are a number of hill districts which are forested. Some of these have been set aside as government forest reserves. They are known respectively as Turtle Mountain Reserve, 70,000 acres; Spruce Woods Reserve, 143,700 acres; Porcupine Reserve, 759,000 acres, and Duck Mountain Reserve, 988,000 acres. The chief lumbering operations are carried on in the spruce forest belt north of the prairie region. Timber is cut only under government supervision. Most of the lumber manufactured is used in the province.

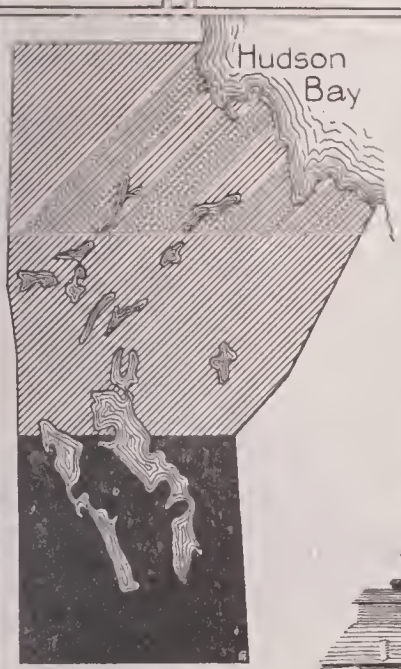
Agriculture. Agriculture is the chief industry of the province. The soil over a great portion of the prairie region is unusually deep and fertile, that of the Red River Valley being of unusual fertility. Both the soil and climate of this region are especially adapted to raising spring wheat of the highest quality, and *Manitoba hard* has become the world's standard for the highest grade of wheat. The production of this cereal is the chief agricultural interest. The other leading grain crops are oats, barley and rye. Some flax is raised, but grain crops are usually more profitable. Potatoes yield from 200 to 400 bushels per acre, and the annual crop is about 7,750,000 bushels. Roots and vegetables are grown everywhere for home consumption. Alfalfa, timothy and corn are extensively grown for fodder.

Live stock is receiving increased attention and dairying is profitable, the annual output of dairy products exceeding $3,800,000. Excellent breeds of horses, cattle, sheep and swine are found on most of the farms, and poultry is a valuable source of income. Beekeeping is increasing in importance and over 100,000 pounds of honey are marketed each year.

Manufactures. The manufactures are limited, and they are connected chiefly with the agricultural interests, with railway repairs and lumbering. Flour mills are found in the larger towns, and flour leads in the manufactured products. Lumber and lumber products and foundry and machine-shop products follow. Some agricultural implements are made, but most of the machinery, agricultural implements, hardware and textiles are imported. The rivers furnish abundant water power and eventually most of it will be used for operating mills, factories and electric plants.

Transportation and Commerce. The southern part of Manitoba is better supplied with railroads than any other part of Canada. The Canadian Pacific, Canadian Northern and Grand Trunk Pacific traverse the province from east to west and connect Manitoba with the other provinces of the Dominion. Branches of the Canadian Pacific, Canadian Northern and the Great Northern make connections with the leading cities in the northern part of the United States and also make north and south connections between the most important cities in the province. A line is now building from Prince Albert, Saskatchewan, to Port Nelson on Hudson Bay. When completed this railway will open to settlement a large area in New Manitoba, and will connect the prairies, through Hudson Bay, with the markets of Europe. Winnipeg is one of the busiest railway centers in Canada and lines radiate from it in all directions. The more densely populated sections are well supplied with telegraph and telephone facilities.

MANITOBA

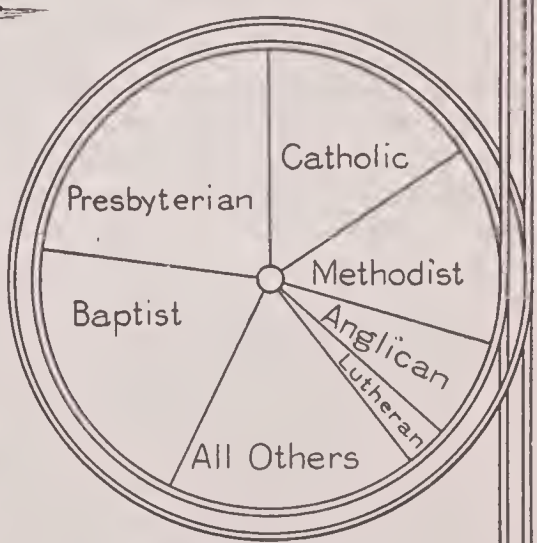


Old and New Manitoba
■ Former Area
▨ Added Territory

Fort Garry
The Beginning of Winnipeg

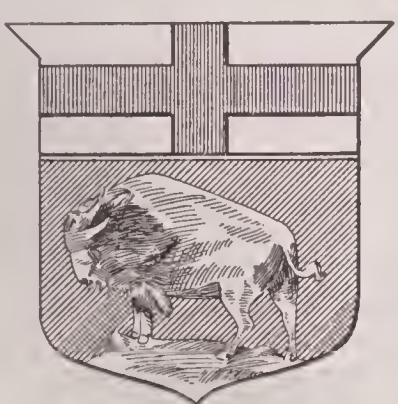
Railroad
Map

Elevators in the
Wheat Country



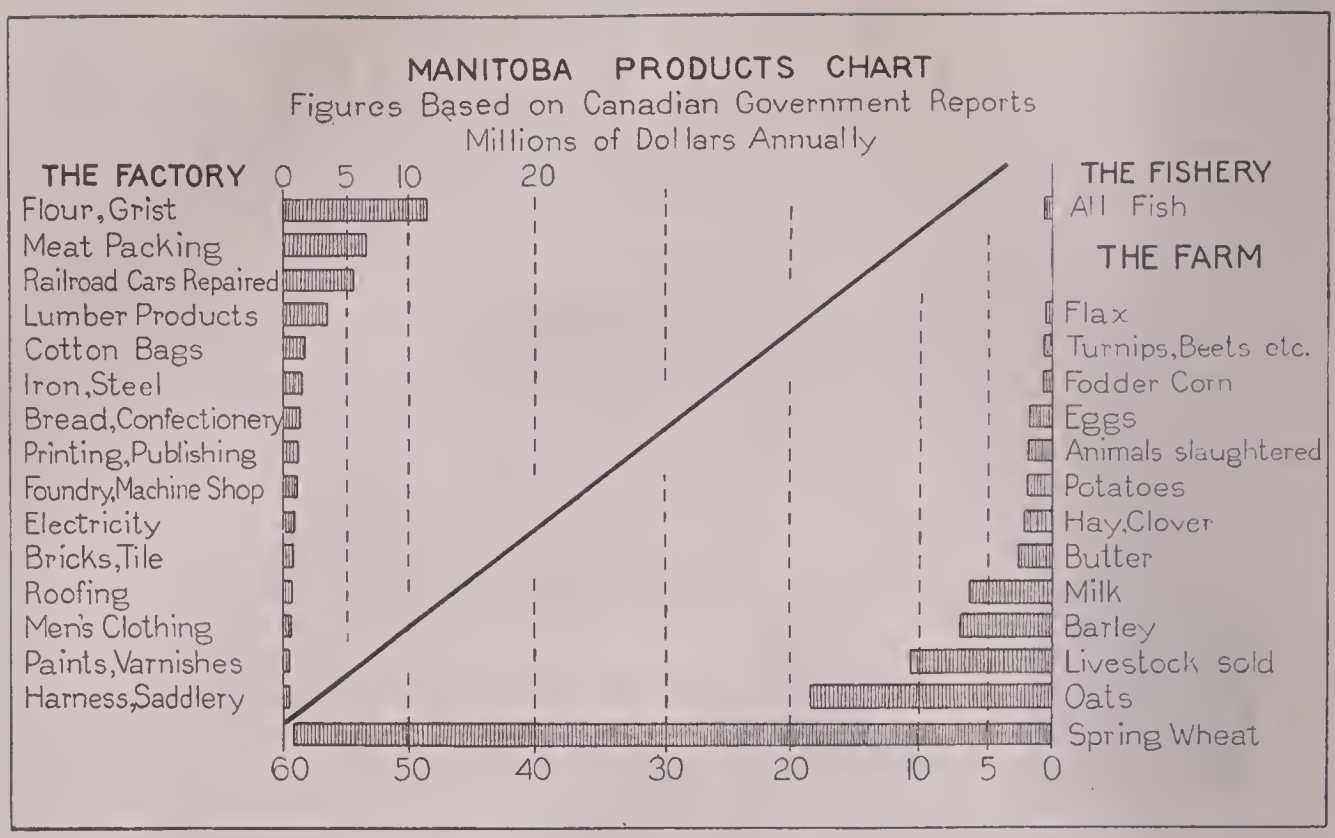
Religions

An Agricultural
Province



Coat of Arms

A Consolidated School



The chief exports consist of agricultural products, of which wheat is the most important. Some lumber is exported, but most of it is consumed at home. The imports consist of manufactured goods, especially textiles, machinery and hardware. Great Britain and the United States are the leading countries with which the province is engaged in foreign trade.

Education. Manitoba maintains an excellent school system. It was the first province to follow the example of the United States and to set aside two sections of land in every township as a grant for the maintenance of public schools. Elementary education is free and compulsory. The schools are maintained from public revenues, provincial and local. The elementary and secondary schools are under the control of a minister of education, who is a member of the executive council of the province. He is assisted by an advisory board composed of twelve members; some of these are elected by the teachers and others are appointed by the department of education. The elementary schools are undenominational in character, but religious instruction may be given after school hours.

The University of Manitoba, at Winnipeg, is at the head of the school system. It was established in 1877 and has affiliated with it several colleges maintained by various religious denominations, as well as public schools. The university has an endowment of 150,000 acres of land. University extension work is carried on throughout the province, and professors from the university give popular lectures on various subjects. Two normal schools are maintained by the provincial government, one at Winnipeg and the other at Brandon. The Winnipeg school aims to prepare teachers for schools in towns and in the country, while that at Brandon prepares teachers for rural schools only.

The Manitoba Agricultural College near Winnipeg, which is affiliated with the university, offers two strong courses, one in agriculture for young men and one in home economics for young women. These courses are so planned that students residing on farms may pursue their studies during the winter and work during the summer. There are also three-year courses for teachers of agriculture and home economics in high schools, and several high schools have classes in these branches.

Government. The executive power is vested in a lieutenant-governor, appointed by the Governor-General of Canada, and an executive council of seven members, responsible to the provincial legislature.

The legislature consists of one house of forty-two members elected for five years by registered manhood and woman suffrage. The province sends fifteen members to the Dominion House of Commons and four members to the Senate. The common law of England prevails in Manitoba, and English is the official language.

RESEARCH QUESTIONS ON MANITOBA

(An Outline suitable for Manitoba will be found with the article "Province.")

For how many miles does this province border on the United States?

How much larger is Manitoba than it was in 1910?

How does the vegetation of the eastern and northern part of the province differ from that of the south?

In what way are the manufacturing interests connected with the natural resources of the province?

How will the province doubtless obtain its power for manufacturing in the future?

Who was the first white man to visit this region, and when did he come? Who was the first white man to build within the territory?

Who are the *métis?*

What interesting superstition is preserved in the name of the province?

What is there of special interest in the geographic situation of Manitoba?

What does the high latitude give to this province which compensates, in the view of the agriculturist, for the shortness of the summer season?

How does it happen, since the annual rainfall is less than eighteen inches, that there is sufficient for agriculture?

Why cannot an electric-light company or a telegraph or telephone company fix its rates to suit itself?

As the population has grown steadily since the last census was taken, in 1910, how does it happen that the average density of population is decidedly less than it was at that date?

What is still found in this region that was sought by the very earliest visitors?

What distinction has the southern part of the province in the matter of railroads?

Who were the first people who came into Manitoba with the intention of making it their permanent home?

Of what mineral substance does this province yield one-third of all that is produced in the Dominion?

With what two countries is most of the trade of Manitoba carried on?

When did this territory come into the possession of the Dominion government?

How many times as large as the original province is the present province?

What is the southern and central part of the province supposed to have been in past geologic ages?

How many people make their living at some phase of the fishing industry?

In what educational idea did Manitoba early follow the example of the United States?

How do you account for the fact that this province has been to a large extent the "storm center" of Canadian politics?

How has this affected the schools?

What has Manitoba done toward the preservation of its forests?

What is the difference in the aims of the two normal schools maintained by the province?

What is *Manitoba hard,* and how does it rank with other products of its class?

How does the provincial school system make special provision for the young men and women who live on farms?

Who was Louis Riel, and what did he attempt to do?

At the head of the judicial system is the court of appeals, with a chief justice who ranks as the chief justice of Manitoba, and four associate judges; then comes the court of King's Bench, with a chief justice and five associate judges. Each district has the usual inferior courts.

For local administration the rural regions are organized into municipalities; denser centers of population are organized into villages, towns or cities, according to the number of inhabitants. These are administered by an elected council, called board of aldermen in the incorporated cities.

Public Utilities Commission. A public utilities commission was created in 1912 and placed in charge of the public utilities of the province. These include telegraph and telephone lines, companies furnishing to the public, either directly or indirectly, water, gas, heat, light, or power, and also such municipalities as shall properly consent to come within its authority. The commission has the power to regulate rates, value the property of public service corporations, control issues of stocks and bonds, and possesses the authority of a court of record. It can enforce its judgments, which are final, except as to the question of jurisdiction, from which an appeal can be taken. Municipal franchises are subject to the commission's approval. The commission is subject to the legislative authority of the province.

History. *Early Exploration.* The first white man to penetrate this region was the French explorer, Sieur de la Verendrye, who explored the neighborhood of Lake Winnipeg in 1733. Five years later he built Fort Rouge, on the site of the present city of Winnipeg. French and Scotch fur hunters and traders began now to visit this region. By their marriage with Indian women a race of half-breeds or *métis* sprang up. After the conquest of Canada by the British in 1763 the fur trade, mostly in the hands of the Hudson's Bay Company, became more active.

The Red River Settlement. Between 1811 and 1817 the Earl of Selkirk made the first attempt permanently to settle this region. He brought a number of Scottish peasants and began to colonize the fertile regions along the banks of the Red River. The colony became known as the Red River Settlement. After the initial difficulties had been overcome the settlement prospered, but still the region remained for the following fifty years almost exclusively in the hands of the fur traders.

Manitoba Made a Province. In 1869 the rights of the Hudson's Bay Company over the northwestern territory were transferred to the newly-founded Dominion of Canada. In 1870 the Red River Settlement was organized into a province and under the name of Manitoba was admitted as the fifth province of the Dominion. The area of the new province was 13,500 square miles and it had a population of about 12,000 inhabitants, largely half-breeds. The French section of these, fearing that their privileges would be abolished, rose in rebellion under the leadership of Louis Riel, but upon the arrival of a British force under General Wolseley, Riel fled and the rebellion collapsed. In 1881 the area of the province was enlarged to 73,732 square miles and in 1912 it was again enlarged to its present size.

The School Question. On account of its situation as the Key to the western provinces, and owing to the fact that its inhabitants belong to many races and to different religious denominations, Manitoba has been the storm center of Canadian politics. One of the most troublesome problems was that relating to religious teaching and to the language of instruction in elementary schools. In 1890 the system of separate religious or parochial elementary schools was abolished and the present system of undenominational schools was established. This measure greatly dissatisfied both the French and Catholic inhabitants not only in the province but in the whole of Canada. After a long agitation a settlement was effected in 1896 by which religious instruction could be given in schools, after school hours.

Other Political Problems. The rapid economic development of the province has given rise to many political and economic questions, such as curbing the monopolistic power of railroads or other big corporations and problems of a similar kind, which have agitated the province and spread to other provinces of Canada. In 1908 the government bought up the telephone system of the province. In 1910 a workmen's compensation act was passed. In 1916 stringent legislation was adopted permitting only the use of English in the public schools. In the same year a strict prohibitory liquor act was passed, and the legislative suffrage was extended to women. In 1917 the university was made a provincial institution, its body of governors being all appointed by the provincial government.

The city of Winnipeg in 1916 had a population of 163,000 (with its suburbs, 200,000) and now ranks as the third city in the Dominion;

it is at times spoken of as the coming "Chicago of the Canadian West." It is in harmony with the province in all progressive measures, and is the leader of Western Canada in social, moral and religious advancement. G.B.

Consult Adams' *Ten Thousand Miles Through Canada;* Legge's *Sunny Manitoba;* Bryce's *Manitoba.*

Related Subjects. The following articles will be helpful to the reader who is interested in Manitoba:

CITIES AND TOWNS

Brandon	Saint Boniface
Dauphin	Selkirk
Minnedosa	Souris
Morden	Stonewall
Neepawa	Virden
Portage la Prairie	Winnipeg

HISTORY

Hudson's Bay Company	Riel, Louis

LAKES

Manitoba	Winnipegosis
Winnipeg	

LEADING PRODUCTS AND INDUSTRIES

Alfalfa	Flour
Clover	Fur and Fur Trade
Corn	Gypsum
Dairying	Potato
Fish	Wheat

RIVERS

Assiniboine	Nelson
Churchill	Red River of the North

MANITOBA LAKE, a lake in the south-central part of the province of Manitoba, about sixty miles west of Lake Winnipeg. It is about 135 miles long and twenty-five miles wide, and has an area of 1,817 square miles—nearly as great as that of Prince Edward Island and 600 square miles larger than that of the state of Rhode Island. Its surface level is forty feet higher than Lake Winnipeg, into which it discharges through the Dauphin River. It is navigable for vessels drawing ten feet of water, but carries little traffic. It abounds in fish, but its fisheries are of little commercial importance in comparison with those of Lake Winnipeg. Moose, elk, deer and wild fowl frequent its shores and are an attraction for sportsmen.

MANITOU, or **MANITO,** *man i too',* an Algonquin Indian word, meaning *mystery* or *supernatural.* The name was given by certain tribes of North American Indians to the spirit of good or evil which was supposed to become the guardian angel of each individual. The manitou is usually represented as an animal and is assigned to an Indian in his dreams during his first religious fast. The animal then becomes his personal fetish (which see); he carries its skin as a charm, and pictures of the animal are tattooed or painted on his body and are engraved on his weapons.

MANITOULIN, *man i too' lin,* **ISLANDS,** a group of islands lying in Lake Huron, separating Georgian Bay from the lake proper. They are set apart from the mainland, the north shore of Lake Huron, by a strait seven to

LOCATION MAP

The large area in black is the chief island of the group, itself called Manitoulin, or Great Manitoulin.

eighteen miles wide, called the North Channel. The islands are irregular in their shape and surface, the larger ones being covered with dense growths of pine. Fishing, sailing and bathing are excellent, and everywhere are hotels and summer homes built to take advantage of these opportunities. About half of the 2,000 people comprising the resident population are Ojibway Indians.

The Manitoulins (meaning *sacred isles*) include dozens of islands. Most of them are in Ontario, including Great Manitoulin, or Manitoulin, and Little Manitoulin, or Cockburn Island. The former, sometimes also known as Sacred Isle, is ninety miles long and from five to thirty miles wide. Cockburn Island is nearly circular in shape, and has a diameter of about seven miles. Drummond Island, the only important one belonging to Michigan, is twenty-four miles long and from two to twelve miles broad.

MANITOWOC, *man i toh wahk',* Wis., the county seat of Manitowoc County, situated about midway between the northern and southern extremities of the state shore line, and at the point where the Manitowoc River discharges into Lake Michigan. Milwaukee is seventy-five miles south. Transportation is provided by the Chicago & North Western, the Minneapolis, Saint Paul & Sault Sainte Marie and the Pere Marquette railroads, the latter by ferry from Michigan, and there is steamer con-

nection with all important lake ports. Manitowoc received its city charter in 1870. Germans and Poles represent the foreign element of the people; the population in 1910 was 13,027; in 1916 it was 13,805 (Federal estimate). The area of the city is nearly three square miles.

Manitowoc has a good harbor and fine shipping facilities, and sends out large quantities of grain, lumber and dairy products. Shipbuilding and ship repairing constitute the principal industries; there are, besides, large grain elevators, coal docks, salt houses, manufactories of furniture, and canning and cheese factories. Manitowoc has three parks. The Polish Orphan Home, the county insane asylum, Holy Family and Saint Mary's hospitals, Saint Felix Industrial and Reform School and Saint James Library are the noteworthy features of the city.

MANKA'TO, Minn., is the county seat of Blue Earth County, in the south-central part of the state. Saint Paul is eighty-five miles northeast; Sioux City is 183 miles southwest. Mankato is on the Minnesota River, just below the mouth of the Blue Earth River, and navigation is possible a part of the year. Built upon the side of the south bluff of the Minnesota River, the city is famed for the beauty of its site. It is served by the Chicago, Saint Paul, Minneapolis & Omaha; the Chicago & North Western; the Chicago, Milwaukee & Saint Paul, and the Chicago Great Western railroads. The area is nearly seven square miles. The population, which is fifty per cent German and Scandinavian, in 1910 was 10,365.

Mankato has a state normal school, a young ladies' seminary (Lutheran), Catholic Mother House and Seminary, and Immaculate and Saint Joseph's hospitals. The Federal building, county courthouse, Carnegie library and Y. M. C. A. building are prominent structures. Places of interest are Rapadan Dam, Minneopa State Park, containing Minneopa Falls, and Sibley Park, where, after an Indian uprising in 1862, thirty-eight Indians were hanged; about 300 others were condemned, but the sentence was commuted by President Lincoln. Near the city are several lakes which attract many summer visitors.

In the vicinity are large quarries of pinkish-buff limestone, the annual output of which is valued at $100,000. Cement works, a traction engine and trip-hammer factory, a creamery package factory, shirt and overall factory and a knitting mill are among the important manufacturing industries. Mankato ships quantities of grain and other agricultural produce. Near the city once stood a village of the Mankato tribe of Sioux Indians, for whom the town was named. It was settled in 1853 and chartered in 1868. In 1910 the commission form of government was adopted. E.F.S.

MANN, Horace (1796-1859), one of the most famous educators the United States has produced. He was born at Franklin, Mass., graduated in 1819 at Brown University, and after studying law at Litchfield, Conn., was in 1823 admitted to the bar. For ten years he practiced law at Delham, and during the latter half of that time was a member of the state legislature; in 1883 he was elected to the state senate, of which he became president in 1836. From the beginning of his public life he showed a great enthusiasm for philanthropy and for educational reform, and this continued throughout his life, often at the cost of his own financial interests.

HORACE MANN
He laid the foundation for America's common school system and organized the first normal school.

When, in 1837, a board of education was appointed to remodel the school system of Massachusetts, Mann was made its secretary. He gave up his law practice and his political aspirations, and devoted all his time and energy to establishing reforms. Many of his measures met with violent disapproval, but he persisted, and in time not only Massachusetts, but practically every state in the American Union profited by his work. Indeed, he may be looked upon as practically the founder of the common school system. At his own expense he visited Europe in 1843, and embodied in his *Reports* the results of his study of educational methods there. He also founded at Lexington, Mass., in 1839, the first training school for teachers in the United States.

In 1848 he was elected to Congress, where he remained until 1853, energetically opposing slavery. From 1852 until his death he was president of Antioch College, at Yellow Springs, Ohio, and in that position made his influence felt in the movement for equal educational opportunities for men and women. Greater than any

specific thing which he accomplished was his success in stirring up a general interest in educational affairs. He wrote *Lectures on Education, Letters and Speeches on Slavery* and twelve annual *Reports* which are regarded as among the classics of educational literature.

Consult the *Biography of Horace Mann,* by his wife, Mary Peabody Mann; Hinsdale's *Horace Mann and the Common School Revival in the United States.*

MANNA, *man'a,* the food provided for the Children of Israel during their forty years of wandering in the Wilderness. It appeared as small, round flakes of a yellowish-white color, and tasted like wafers made with honey (*Exodus* XVI; *Numbers* XI). In *Exodus* XVI manna is said to have rained from heaven each morning. The daily portion of each person was about six pints, or an *omer,* and was gathered in the morning for the day. Gathering more than the day's allowance was forbidden, and manna gathered in defiance of the order soon decayed. On the sixth day, twice the usual amount fell, and two omers were gathered in preparation for the Sabbath. When the Children of Israel crossed the Jordan into Canaan, the fall of manna ceased. A substance like manna found on the camel's thorn, an Asiatic shrub, is sometimes called *Jews'* or *Hebrew manna.*

MANNERING, *man'cr ing,* Mary (1876-), an English actress who has won the admiration of her audience because of personal charm and sweetness of voice. Until twenty years of age she acted principally in English provinces, having made her début with Mrs. Brown Potter and Kyrle Bellew in *Hero and Leander.* Then she was engaged by Daniel Frohman and introduced to American audiences. Her first American appearance was at Hartford, Conn., as Leonie in *The Courtship of Leonie.* She then dropped her family name of Florence Friend, by which she had been known on the English stage, and assumed that of "Mary Mannering," the maiden name of her grandmother. Among the many plays in which she has acquired a high reputation are *Trelawney of the Wells, Janice Meredith, The Lady of Lyons, The Stubbornness of Geraldine, The Walls of Jericho, A Man's World* and *The Garden of Allah.* After her divorce from James K. Hackett, whom she had married in 1897, she became the wife of Frederick E. Wadsworth.

MARY MANNERING

MANNHEIM, *mahn'hime,* a city in the former grand duchy of Baden, situated on the right bank of the River Rhine, near its junction with the Neckar. The old fortifications have been converted into gardens, and the town is one of the cleanest in Germany. The old grand-ducal palace, which covers fifteen acres, and is the largest of its kind in the country, contains a fine picture gallery and a library. The flourishing machine works of the city, which give employment to 10,000 persons, turn out great numbers of agricultural implements and gasoline and electric motors. A celluloid factory employs 2,000 workmen. Cigars, carpets, rubber, railway supplies, mattresses and leather goods are other products of manufacture. The great river trade of Mannheim has been stimulated by the construction of extensive docks and harbors. Population, 1911, 194,000.

MANNING, *man'ing,* Henry Edward (1808-1892), a cardinal of the Roman Catholic Church, leader in Roman Catholic movements in England, and active worker for the betterment of the social life of the people, especially along temperance and educational lines. Cardinal Manning was born at Totteridge in Hertfordshire, England, was educated at Balliol College, Oxford, and later was made a Fellow of Merton. In 1851 he left the Church of England and joined the Church of Rome. His advancement in that communion was rapid from the first. He founded the congregation of the Oblates of Saint Charles Borromeo at Bayswater, London, was made archbishop of Westminster in 1865 and cardinal in 1875. Before his secession to Rome, he published several volumes of powerful sermons. Through his defining of Papal infallibility at the Vatican Council in 1870 he gained world-wide renown. He was a devout priest, a statesman always loyal to the Church, and a practical reformer.

MANSARD, ROOF, *man'sahrd,* a variety of curb-roof designed to replace the ordinary attic with a top story almost as spacious as that below. There are two slopes to the roof, the lower being but little inclined from the upright, and pierced with windows. The upper slope is variable in pitch, but more nearly flat than the

ordinary curb-roof. Although first used in the Louvre by Pierre Lescot, about 1550, the Mansard took its name from François Mansart, the

MANSARD ROOF
With dormer window on side.

French architect who brought it into general favor.

MANS'FIELD, Richard (1857-1907), distinguished for his intellectual and spiritual interpretation of romantic and tragic rôles, was for years the leading actor on the American stage. He was born on Helgoland, now a German island fortress in the North Sea, and was the son of a London wine merchant and an opera singer. As a youth he studied painting at the South Kensington Art School, London, but was unable to continue his studies because of lack of funds. At the age of seventeen he emigrated to America and began work as a clerk in a Boston mercantile house. The following year Mansfield went to England, where he began his theatrical career by singing in Gilbert and Sullivan operas.

RICHARD MANSFIELD

Returning to America in 1878, he soon won success in the regular dramatic field, his first notable part being that of Baron Chevrial in *A Parisian Romance.* Later he attained wide fame through his portrayal of such rôles as Dr. Jekyll and Mr. Hyde, in the play adapted from Robert Louis Stevenson's famous novel, of Beau Brummell, of Arthur Dimmesdale, in his own adaptation of *The Scarlet Letter,* of Monsieur Beaucaire (from Booth Tarkington's novel), of Brutus in *Julius Caesar* and the leading part in Ibsen's *Peer Gynt.* Though Mansfield was sometimes criticized for various mannerisms and eccentricities, no one did more than he to uphold the dignity and high ideals of his profession.

MANSFIELD, Ohio, the county seat of Richland County, is in the north-central part of the state, fifty-five miles south and east of Sandusky and sixty-eight miles southeast of Toledo. It is on the Pennsylvania, the Baltimore & Ohio and the Erie railroads, and has several interurban electric lines. The population, which includes a number of Hungarians, Slavs, Greeks and Italians, in 1910 was 20,768; in 1916 it was 22,734 (Federal estimate).

Mansfield has an area of five square miles. It is well situated on a prominence 1,200 feet above sea level. Sherman-Heineman Park of 100 acres is a part of a chain of parks. There are many handsome private residences, a Federal building, a soldiers' and sailors' building, Carnegie Library, a cathedral (Roman Catholic), Y. M. C. A. building and a public emergency hospital; and here are located the county children's home, the county infirmary and the Ohio state reformatory.

The city is the distributing center for the surrounding country, a productive grain section. Two miles distant are coal fields. Mansfield is known for a great variety of manufactures, among which are sheet steel, automobile tires, rubber, stoves, farm implements, sawmills, threshers, chains, pumps, sanitary ware, ammunition and watchcases. The annual value of manufactured products exceeds $16,000,000.

Mansfield was organized in 1808, incorporated as a village in 1828 and became a city in 1857. It was named in honor of Jared Mansfield, a surveyor and West Point professor. The city was the home of John Sherman from 1840 until his death. C.S.W.

MANSLAUGHTER, *man'slaw ter,* the wrongful killing of another without malice, expressed or implied. It differs from murder in not proceeding from deliberate malice, or *malice prepense.* Manslaughter has been distinguished as *voluntary,* where the killing is intentional, but done in the heat of passion and without previous malice; and *involuntary,* the result of criminal carelessness, or occurring while the offender is engaged in some wrongful act. An example of voluntary manslaughter is the killing of a person in a quarrel; a reckless automobile driver who runs over and kills a pedestrian is guilty of involuntary manslaughter. The punishment for manslaughter is regulated

by statute, and varies in different countries. Imprisonment for from one to fourteen years is the ordinary penalty for this form of crime, which ranks below the different degrees of murder. See HOMICIDE; MURDER; CRIME.

MAN'TELL, ROBERT BRUCE (1854-), theatrical manager and actor whose repertoire embraces over twenty plays of a classical and historical order. In Shakespearean rôles Mr. Mantell has been remarkably successful. He possesses personal magnetism, and his power upon his audiences is direct and convincing. He was born at Ayrshire, Scotland. When four years old his parents moved to Belfast, Ireland, where he grew to manhood. He made his first theatrical appearance at Rockdale, Lancashire, England, in 1874, and the following year sailed for America, in the hope of securing an engagement at the Boston Museum. Unsuccessful, he returned to England and for a long time was a member of Mme. Modjeska's company. Not until 1885 did he appear in New York, when he played the leading part in *Tangled Lives.* Other successful plays in which he has starred are *The Corsican Brothers* and *The Marble Heart.* His Shakespearean repertoire includes *Hamlet, Othello, Romeo and Juliet, Julius Caesar, King John, Richard III, King Lear* and *Macbeth.*

MAN'TIS, the popular name of an insect sometimes called the *praying inseet,* or *praying mantis,* from its attitude when at rest, which is somewhat that of prayer. The structure of its front legs is remarkable; they are bent and admirably adapted for catching other insects, on which it lives. It inhabits the warmer countries. In form and color the mantis so closely resembles the trees and plants it frequents as almost to defy detection, and thus it easily catches its prey. A species found in the Southern United States is regarded with superstition by the negroes, largely because of its grotesque appearance.

THE MANTIS

MANUAL, *man'u al,* **TRAINING.** The boy's manual training begins with the possession of his first jackknife. Shall he whittle aimlessly just to make chips, or shall he be so directed that his whittling will result in skill in the use of his knife and in the making of something useful? In the answer to this question we find the reason for the introduction of manual training into the public schools. *Manual training* is the term applied to all forms of construction work used as an agent in general education. In its broadest application the term includes all the construction work in the lower grades, but as ordinarily used it applies to the work of boys with tools in the grammar grades and the high school.

Much of the construction work required in connection with drawing in the lower grades forms an excellent preparation for real manual training lessons which begin in the sixth or seventh grade. The work for boys in the elementary schools consists in lessons in the thorough use and care of woodworking tools, exercises in carpentry and such lessons in mechanical drawing as may be necessary to enable the pupils to make drawings of the objects they are to construct. The girls take sewing and cooking.

High school courses include carpentry, machine work, forging, and, in some schools, founding. Schools offering these courses have well-equipped machine shops, blacksmith shops and laboratories for performing experiments in physics and chemistry. The work in mathematics is given a practical turn by application of the principles of algebra and geometry to the solution of problems arising in the manual training exercises, and a full course in mechan-

ical drawing is required. Technical high schools are practically vocational schools in which students receive thorough industrial training.

Purpose. The first manual training school in America was opened in Saint Louis by Dr. Calvin A. Woodward as a department of Washington University. The work was so successful that similar schools were opened in other large cities. The purposes of the school opened in Saint Louis, as set forth by Dr. Woodward, were:

"(1) To furnish a broader and more appropriate foundation for higher technical education.

"(2) To serve as a developing school where pupils could discover their inborn aptitudes whether in the direction of literature, science, engineering or the practical arts.

"(3) To furnish those who look forward to industrial life opportunity to become familiar with tools, materials, the methods of construction and exact drawing, as well as with mathematics, elementary science and ordinary English branches."

In the grades manual training was for several years considered to be essentially a culture study. Its chief purpose was "to develop the child by developing the brain and increasing its control over materials through the hand and the eye." It trained the pupils in observation, strengthened the will and afforded opportunity for making practical applications of such studies as arithmetic and drawing. Manual training has always been regarded as a means of expression and this is perhaps the strongest claim that can be made for it as a culture study.

Be this as it may, from its introduction into the public schools of Boston in 1882, it was gradually extended over the country, and at the beginning of the twentieth century there was scarcely a city of 8,000 or more inhabitants that did not include manual training in its course of study. Practically the same courses were found in all schools. Since these courses were based upon the needs of cities they were not well suited to the smaller towns or to rural schools, and the work was not encouraged in these places.

Recent Changes. The rapid development of American industries and the consequent growth of cities are making necessary radical changes in both the courses of study and methods of instruction in the public schools, and since 1910 vocational training, or pre-vocational training, has been emphasized more than manual training, though by some educators the same meaning is applied to both terms. The chief difference between vocational and manual training lies in the end sought. Vocational training has for its purpose the fitting of the pupil for entering upon an occupation, while manual training seeks the complete development of the pupil without special regard to the occupation he may choose. Vocational training would train a boy to make boxes, that he might earn his living by making boxes. Manual training would use box making as a means of giving the boy a knowledge of the material used and skill in the use of the tools employed.

The value of manual training in rural and consolidated schools, provided the course is adapted to the needs of the boy on the farm, is almost beyond estimate. He finds he must know how to use many tools and to acquire sufficient skill in their use to enable him to repair his tools and implements, mend his harness and cut and solder sheet metal. W.F.R.

Related Subjects. The reader of this discussion of manual training is referred to the following articles for related information:

Carpentry
Domestic Art
Gardening
Gary School System
Household Arts in Education
Industrial Art
Industrial School
School Garden
Sloyd
Technical and Industrial Education
Vocational Training

MANURES, *ma nures'*. When plants grow they obtain their food partly from the air and partly from the soil. The soil constitutes a receptacle for the materials plants require for their growth. Every plant is its own chemist and can be trusted to take care of itself, if the necessary materials, in a suitable condition to serve as food, are placed within its reach. But the materials thus extracted by the plant from the soil ought to be replaced, for otherwise the soil will lose its fertility and become incapable of producing any more crops. Any substance which is applied to the soil in order to restore or increase its fertility is technically a *manure*.

Farm, or *Barnyard, Manure.* Manures are divided into *natural manures,* and *fertilizers,* or commercial manures. In this article it is intended to deal with natural manures as distinct from fertilizers, which are treated elsewhere in these volumes (see FERTILIZER). In the latter article a great deal of information about the requirements of growing plants, and the best kind of manures suitable to the nature of the various soils and of the various crops, is given.

Its Value in Agriculture. The most important of the natural manures is farm, or barnyard, manure; this means the excrements of farm animals. Farm manure contains all the

elements which the plant requires for its growth, namely nitrogen, phosphoric acid and potash. But farm manure not only enriches the soil with these elements, but it also improves the mechanical condition of the soil; it makes it warmer, and enables it to absorb and retain more moisture. As farm manure contains a great percentage of organic matter it also helps to make the materials already existing in the soil more available as food for the plant. In fact, this service of improving the quality of the soil is sometimes far greater than that derived from the plant food it supplies. The neglect in preserving and properly using farm manures has been a great drain on the natural resources of the soil.

The quality of the barnyard manure depends upon the kind and age of the animals producing it, the quantity and the quality of the food they have and the nature and amount of the litter added. Its value also depends greatly upon the care taken for its preservation, especially of the liquid part of it. It is well to remember that five-eighths of the plant food which the manure supplies is found in the liquid portion. Farm manure ought to be kept under cover so that it will be protected from air and rain, otherwise it will lose much of its valuable elements by fermentation or by being washed away by the rain.

Properly-handled farm manure is by all means the best remedy for poverty of soil. Very few farmers handle manure so as to get even as much as half the possible value from it. There is probably no greater waste in the world than in connection with the handling of farm manure by the average farmer.

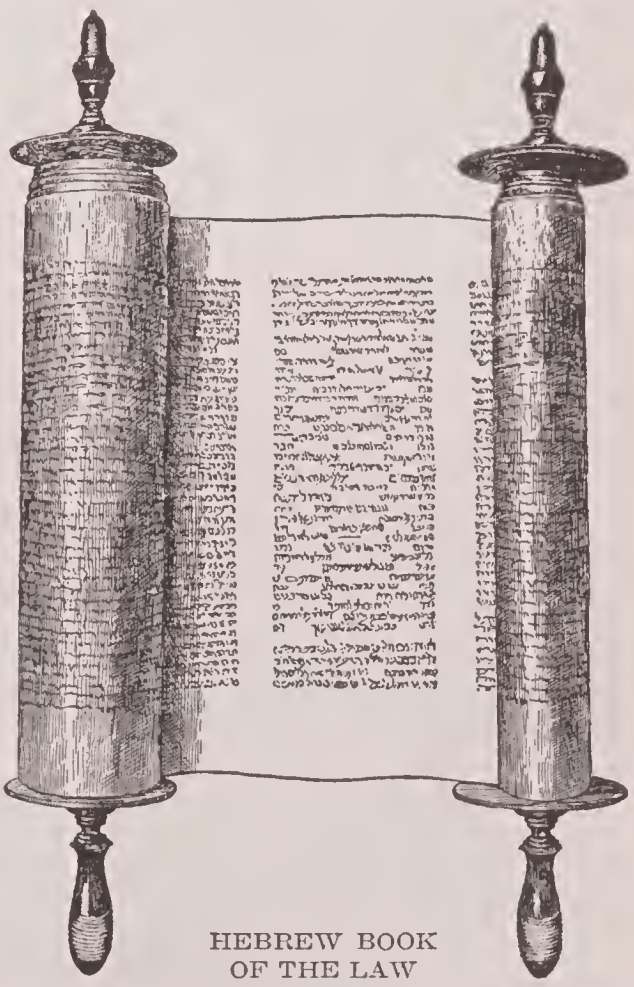
The average mixed farm manure contains approximately about 0.50 per cent nitrogen, 0.40 per cent potash and 0.30 per cent phosphoric acid. This means that a ton of farm manure contains ten pounds of nitrogen, eight pounds of potash and nearly seven pounds of phosphoric acid. It has been found in practice that the best way to utilize farm manure is to mix it with commercial fertilizers, after a careful study has been made of the requirement of the crops to be grown and of the character of the soil.

Farm manure usually gives the best results when spread evenly over the surface and plowed under or harrowed in. Fresh farm manure, being rich in nitrogen, has a forcing effect and tends to produce stems and leaves at the expense of fruit and grain. It is therefore better suited to use for market garden products, grasses and forage plants than for grain crops; for the latter only well-rotted manure ought to be used.

Green Manures. Another important class of natural fertilizers includes the green manures, that is, crops that are grown for the purpose of being plowed under while they are green in order to increase the stock of nitrogen in the soil. The most valuable crops in this respect are the leguminous (pod-bearing) plants, such as clovers, peas, beans, and so on, while rye is also used to some extent for that purpose. See GUANO. O.B.

Consult Thorne's *Farm Manures;* Van Slyke's *Fertilizers and Crops;* Wheeler's *Manures and Fertilizers.*

MANUSCRIPTS, *man'u skripts,* the name given to compositions written with the hand, as distinguished from printed works. In its commonest sense, the word refers not to inscriptions on stone or on clay, but to writings on



HEBREW BOOK OF THE LAW

some flexible material, such as the ancient papyrus or parchment and the modern paper. Other materials have been used at certain times and for special purposes, among them the leaves and bark of trees, linen and the skins of animals, but the "ancient manuscripts" of the classic and medieval ages, to which the term

has come to be applied in an almost technical sense, were almost exclusively on papyrus, parchment or paper. Black ink, made of lampblack, boneblack or some vegetables substances, was most used, but red, purple and even yellow inks were sometimes employed for decorative purposes.

The earliest form of manuscript was the roll, or *volumen,* which was also called *biblos,* from the Greek name for papyrus. Sheets of papyrus or of parchment were joined together to make a long strip, the joining being so expertly done that there was no obstacle to the pen. Often a number of rolls were needed for a single work, as very large rolls were unwieldy. Beginning at the left, the work was written in columns of from two to three and one-half inches in width, the lines running parallel with the length of the strip. In rolling the finished work onto its central stick, the last part was of course rolled on first, so that the manuscript might be read as it was unrolled. After it had been read, it had to be rolled back again, that it might be in shape for the next reading.

As long as rolls were used, the manuscript was written on one side only, for a roll written on both sides would have been very inconvenient. The papyrus, moreover, was smoother on one side than on the other. When parchment, or vellum, came into use, its durable quality suggested the possibility of using both sides, and a more suitable book form was sought. The little waxen tablets, two or three of which were hinged together into something approaching in form the modern book, served as a model for the codex, or stitched volume. By the fourth century the codex, which had recommended itself by its greater convenience for reference, had almost displaced the roll for ordinary works, though the latter was still used for legal documents, records and liturgies. For such purposes it is in occasional use even to-day.

As a writing implement, the first in use was a reed softened at the tip and used as a brush for tracing the letters. The later Greeks and Romans used reeds also, but they pointed and slit them, so that they closely resembled the modern pen; and bronze pens were common in the days of the Roman empire.

Illumination of Manuscripts. The illumination of manuscripts is almost as old as the earliest making of them. Strictly speaking, the term applies only to the decoration of the text with gold, silver and brilliant colors, but it is commonly used to denote any ornamentation. The oldest-known manuscript with decorations in color is a papyrus roll of the *Egyptian Book of the Dead,* which dates from the fifteenth century B. C., but the brilliantly-colored pictures are in the nature of illustrations rather than of pure ornamentation. Among the Greeks and Romans, illumination of manuscript seems not to have become common until about the fourth

MANUSCRIPT COVER

A heavily-jeweled cover lovingly wrought over twelve hundred years ago.

century. From that time on, the various styles begin to be evident. There were illustrations of scenes described in the text; there were decorative borders, initial letters, vignettes and tailpieces, many of them done in gold and gorgeous colors. Copies of the Bible, in particular, were abundantly supplied with such ornamentation, and some manuscripts were of great beauty. When printing was introduced, the art began to wane. The early printed books, however, often had spaces left for the huge initial letters which had become common in the manuscripts, and these were introduced by hand. Very high prices have been paid for copies of the old illuminated manuscripts. A.MC C.

MAN WITHOUT A COUNTRY, THE. See subhead under HALE, EDWARD EVERETT.

MAORI, *mah o'ri,* the name of the native inhabitants of the two islands of New Zealand; the word *maori,* in their language, means *native.* They are above the average in stature, brown

in color, and have thick, crisp (but not woolly) black hair. The Maoris, in point of physical development, are among the strongest races known. They ornament themselves by tattooing their faces with fantastic figures, a practice which gives them a wild appearance and makes their faces from a distance appear blue. At one time the Maoris were one of the fiercest cannibal tribes of the South Pacific, and waged many bloody wars with the white people, but since the English seized New Zealand they have greatly altered by contact with civilization, and very little remains of their primitive conditions. Their clothing is much the same as that of the white residents of the islands; they have embraced the Christian religion, and are industrious, intelligent people.

See the full-page drawing accompanying the article NEW ZEALAND, for the life habits of the Maoris.

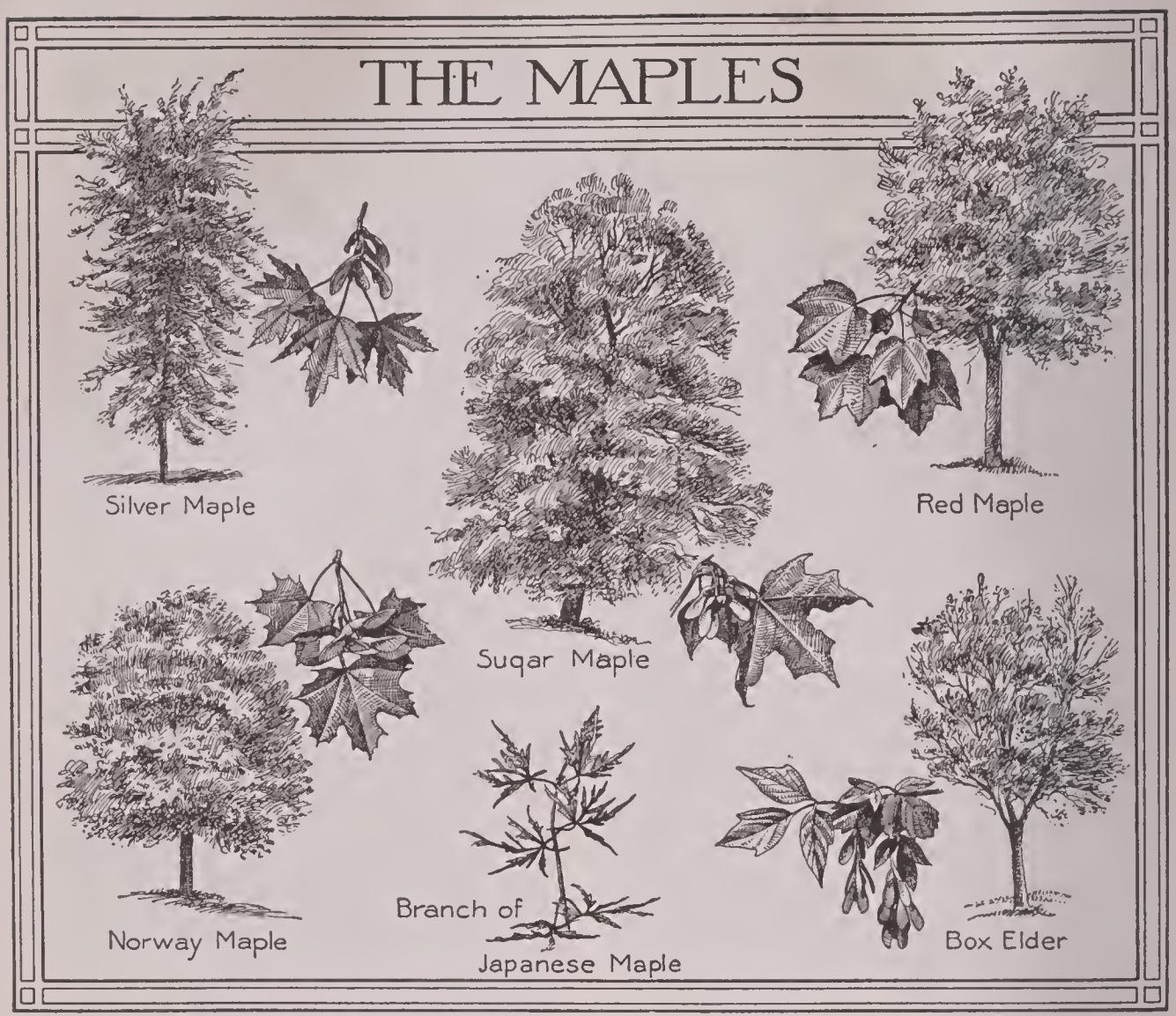
MAP, a picture or diagram that shows the position of places on earth, or of stars in the heavens. If a photograph of the earth's surface were taken from an aeroplane in flight one kind of a map would be secured, but it would show many details which must be left off a practical map, for there must be room for printed names of the principal places. On the other hand the photograph map would not show man-made boundaries, and if it included much of the earth's surface it would not show railroads and rivers, which are small but often very important.

The purpose of a map determines the kind and amount of details which are shown. The usual map shows political divisions (countries, states or provinces, counties), cities, mountains, rivers, lakes, coast lines, railroads or principal trade routes. The map of a city shows all its streets. A chart, or sailors' map, tells the location of shoals and other places of danger to ships. A statistical map gives the relative importance of places in any one particular (for an example see map of alfalfa production in the article ALFALFA). Maps are also made to indicate historical changes (see map showing territorial acquisitions in the article UNITED STATES; also various maps indicating changed political divisions, such as ALBERTA, page 153).

Contour and Relief Maps. Contour and relief maps show the height of the places which they locate. One style of contour map draws lines through points at an equal distance above or below the sea level. Sometimes colors are used to emphasize the differences, blue for the ocean, green for lowlands, brown for mountains. The deepest shades mark the highest and deepest parts. (Contour maps will be found in the articles ASIA, AFRICA, EUROPE, NORTH AMERICA and SOUTH AMERICA.) A relief map is not a drawing but a model in cement or some other hard material to imitate the elevations and depressions of land. It cannot, however, represent accurately the steepness of slopes. Suppose, for instance, a relief map of India were made the length and breadth of this page. If it were correct in its proportions Mount Everest, the tallest peak in the world, would be only twenty-five one-thousandths of an inch high, and the map would not be a relief map after all. So in making it we should have to represent heights on a different scale than horizontal measurements.

History. Maps were probably made before writing of any sort was known, for savages sometimes direct explorers by drawing diagrams on the ground with a stick. A map in the British Museum, made on clay, is over 4,000 years old. Ptolemy, who lived in the second century, drew better maps than any known till after Columbus discovered America (1492). In the sixteenth century a man in Flanders called Mercator (which is Latin for Kremer, his real name, and means *merchant*) corrected and improved Ptolemy's work. As methods of measuring *latitude* and *longitude* (which see) improved, much more accurate maps were drawn. The first globe was perhaps made by Thales of Miletus, in the sixth century B. C., but after the decline of Greek learning the earth was believed flat till Columbus' discoveries.

No flat map can accurately represent the surface of the globe. On a map of the world made according to *Mercator's Projection* (see map OCEAN CURRENTS), on which all points in the same longitude are in the same vertical line, North America appears very much larger than South America because the one is broadest near the pole, where East and West distances are exaggerated by this plan, and the other is broadest near the equator. The custom of representing North by the top of the map, South by the bottom, East by the right side and West by the left side is copied from Ptolemy. Until recently maps were drawn with an inch or other unit of measure representing a certain number of miles; now they are generally made so that any measurement stands for a definite number of times its own length; for example, a million. The colored maps in this set of books representing the continents of North and South America, Europe, etc., are drawn to the scale



of 1 to 9,000,000, or, in other words, about 150 miles to 1 inch. C.H.H.

Consult Dickson's *Maps: How They Are Made and How to Read Them.*

MAPLE, *ma'p'l,* a family of handsome and valuable trees, probably represented in some manufactured form in every house in America. Nearly a hundred species are known, distributed throughout the northern and temperate regions of the world. Species of maple furnish most of the welcome shade along streets, and their beautiful foliage, fragrant, nectar-filled flowers and strangely-winged seeds are sources of constant pleasure.

All maples have opposite leaves (see LEAVES); they are broad and flat, with handlike veins and fingers, or lobes, numbering from three to seven, and their long-winged seeds in pairs. When growing in the open, all have full, well-rounded tops.

American Species and Uses. Leading all maples is the upright, gray-barked *sugar, rock* or *hard maple,* found from the Great Lakes to Newfoundland, south to Florida and west to Nebraska and Texas. It grows from seventy-five to 120 feet high and bears dark green leaves, which turn yellow, orange and red in autumn. The sugar maple leaf is the emblem of Canada. It is this handsome tree whose sugary sap is the source of the delicious golden-brown maple syrup which is so palatable on the breakfast table. Sugar manufactured from the sap is a commercially important article, particularly in Vermont, Northern New York and Canada. The tapping of maple trees and the "sugaring off" are outdoor tasks holding such keen delight and interest that an account of the process is given in Charles Dudley Warner's story, *Being a Boy.*

As a lumber tree, this species outranks all other maples. Its wood is heavy, hard and strong and takes a fine polish. Its color is light brown, tinged with red. Ever since colonial times it has been put to uncounted uses. Maple has been used for furniture ever since furniture was made in America. The knotted parts of sugar maple furnish the much-prized *bird's-eye* and *curled maples* of cabinetmakers. Hard

maple is widely used for flooring. Saddles, boats, shoe lasts and wooden kitchen ware are made of hard maple, and it is used for bicycle rims, various parts of automobiles, and parts of many musical instruments. In the manufacture of agricultural implements sugar maple holds an important place, heading the list of woods used for that purpose in many great manufacturing centers. It is widely used as fuel, and as a producer of ashes for fertilizer and other purposes sugar maple stands first. About 1,167,000,000 board feet of maple are cut in the United States yearly and most of that is from the sugar maple.

Other American species are the *black maple,* also a sugar producer; the widely-grown *silver maple,* beautifully clothed in shimmering silver and green, a quick-growing, hardy tree, but with light, brittle wood; the *broadleaf,* or *Oregon maple,* the most valuable hardwood of the Pacific coast; the small *striped, mountain* and *dwarf maples;* the *vine maple,* and that valuable ornamental and lumber tree, the *red,* or *swamp maple,* of which Lowell writes in his *An Indian Summer Reverie:*

> The maple swamps glow like a sunset sea,
> Each leaf a ripple with its separate flush.

In Canada, maples comprise thirty per cent of the trees furnished by the government to meet the lack of natural protection against wind and snow.

Foreign Maples. The *sycamore maple,* with thick sycamorelike leaves and wide-spreading branches, is the most important hardwood tree of Europe, and is planted in America to some extent. The *Norway maple,* a large tree with dense foliage, is popular in England and is extensively grown in middle-western America. Various species of low-growing, feathery leaved *Japanese maples* are widely used for ornament.

Maple Insects. All maples are frequently attacked by injurious insects. Some bore into the bark while others eat the leaves. Great damage is often done by the tent caterpillar, the sugar-maple borer, numerous scales and species of plant lice and galls. Various washes, when the leaves are off the trees, are effective cures for scales. Whitewashing the tree trunks several times a season will keep out the borers.

Related Subjects. The reader is referred to the following articles in these volumes:

Insecticides and Fungicides	Maple Leaf, The
Leaves	Sugar
	Tent Caterpillar

MAPLE CREEK, a town in Southwest Saskatchewan. It is on the main line of the Cana-

The Maple Leaf Forever

In days of yore, the hero Wolfe,
Britain's glory did maintain,
And planted firm Britannia's flag
On Canada's fair domain.
Here may it wave, our boast, our pride,
And join'd in love together,
The Thistle, Shamrock, Rose entwine
The Maple Leaf forever.

CHORUS.

The Maple Leaf, our emblem dear,
The Maple Leaf forever!
God save our King, and heaven bless
The Maple Leaf forever!

On many hard-fought battle fields
Our brave fathers, side by side,
For freedom, homes and loved ones dear,
Firmly stood and nobly died:
And those dear rights which they maintained,
We swear to yield them never,
We'll rally round the Union Jack,
The Maple Leaf forever!

Chorus.

In Autumn time our emblem dear
Dons its tints of crimson hue;
Our blood would dye a deeper red,
Shed, dear Canada, for you!
Ere sacred rights our fathers won
To foemen we deliver,
We'll fighting die—our battle cry,
"The Maple Leaf forever."

Chorus.

God bless our loved Canadian homes,
Our Dominion's vast domain:
May plenty ever be our lot,
And peace hold an endless reign;
Our Union, bound by ties of love,
That discord cannot sever,
And flourish green o'er Freedom's home,
The Maple Leaf forever!

Chorus.

On Merry England's far-famed land,
May kind heaven sweetly smile;
God bless old Scotland evermore,
And Ireland's emerald isle!
Then swell the song, both loud and long,
Till rocks and forests quiver;
God save our King and heaven bless
The Maple Leaf forever!

Chorus.

dian Pacific Railway, eighty-five miles southwest of Swift Current and sixty-three miles east of Medicine Hat. Maple Creek is of importance as a distributing and shipping point for the surrounding mixed-farming district. It has large grain elevators, farm-implement warehouses and lumber yards, and its only manufacturing establishment is a flour mill. The town owns and operates its waterworks and sewerage system. The local post office, which cost $35,000, is the most striking building. Population in 1911, 936; in 1916, estimated, 2,000. W.J.R.

MAPLE LEAF, THE, the national song of Canada, celebrating the Dominion emblem, the leaf of the sugar maple. One who has visited the forests of Eastern Canada in the autumn and has seen them fairly ablaze with the red and gold of the frost-tinted leaves of this beautiful tree feels the fitness of this emblem. The song, while it celebrates the valor of the "brave fathers" of bygone days, is not purely a *Dominion* song, but rather an *Empire* song, for it "entwines" with the beloved maple leaf the rose of England, the thistle of Scotland and the shamrock of Ireland, and it closes with the invocation of a blessing on those far-away but closely-related lands. The words of the song appear on page 3643.

MARABOU, *mair'a boo,* a stork from which is obtained the marabou feathers that are used so much for muffs and scarfs and as trimming for hats and gowns. There are two species; the original marabou, a large, white stork with greenish-gray wings and a large pouch beneath its bill, is a native of Africa, where it lives on fish, the larger lizards and small mammals; the other species, the *argala,* or *adjutant bird,* is common in India, where it is called *the bird of blessing.* Both kinds have the soft, much-prized, downy feathers under wings and tail.

MARACAIBO, *mah rah ki'bo,* the principal seaport of Venezuela and the capital of the state of Zulia. It is situated on the western shore of a strait that connects Lake Maracaibo with an arm of the Caribbean Sea, the Gulf of Maracaibo. It has all the equipment of a modern progressive city, with fine public buildings and a university, and for a long time it was the literary center of Venezuela. At the present time it is the only port of entry for Western Venezuela and a section of Eastern Colombia, and it carries on a thriving export trade in coffee, cocoa, hides, sugar, dyewoods and quinine. Its estimated population is 55,000.

Lake Maracaibo, situated in the northwestern part of Venezuela, is connected with the gulf of the same name by a strait about fifty miles long. At the broadest part the lake is about eighty miles wide and in places reaches a depth of 500 feet, but owing to a sandbar at its entrance vessels drawing more than ten feet of water cannot enter.

MARAJO, *mah rah zho',* or **JOANNES,** *jo ah'neez,* a large island about 180 miles long and 150 miles wide, lying between the estuaries of the Amazon and Para rivers, and belonging to the state of Para, Brazil. It is so low and swampy that during the rainy season the greater part of it is flooded, but in the dry season much of it affords excellent pasturage. In the swampy forests there are dense groves of rubber trees. The island is sparsely inhabited, though there is a small settlement on the east side, called Sauré. Most of the inhabitants are herders and rubber hunters who visit the island during the dry season.

MARAT, *ma rah',* JEAN PAUL (1744-1793), the second of three men in succession who wrought the worst evils in the French Revolution, Danton being first and Robespierre third. He was born at Boudry, studied medicine in Bordeaux, then removed to Paris and won fame as a court physician. After traveling extensively in Europe, he practiced medicine in London and published a number of scientific works. In 1789 he established a journal in Paris called *Le Publiciste Parisien,* which became the organ of the irresponsible element of the French capital. From this time he dropped all scientific study and identified himself with the Revolution. He called himself the friend of the people, and was always urging death upon the guillotine for opponents of his policy, at one time demanding 270,000 heads.

In 1792 he became a member of the Commune, and through his journal he instigated an insurrection, claiming that "no poverty, no misery or persecution could keep him quiet." He was brought before the Revolutionary Tribunal in April, 1793, but was acquitted of the charge of sedition and became even more powerful. His wickedness so stirred the heart of a girl named Charlotte Corday that on July 13, 1793, she slew him with a dagger, and for her act suffered death on the guillotine. See CORDAY D'ARMONT, MARIE ANNE CHARLOTTE; FRENCH REVOLUTION.

MARATHON, *mair'a thon,* a plain in Greece, on which was fought one of the decisive battles in the world's history. It is about twenty miles from Athens, and it was the Athenians, with their allies, the Plataeans, who, in 490 B.C., de-

CARRARA MARBLE.

Quarries at Carrara, Italy, which have been worked for 2,000 years. At left, hauling blocks to the village. At right, sawing slabs by hand. The workman can saw but four inches per day.

Copyright:
Underwood & Underwood

IN FAMED CARRARA.

A present-day scene in the Italian village which was noted for its marble before the birth of Christ. Marble refuse gathered during twenty centuries.

feated the army of the Persian king Darius. Miltiades, the Athenian general, had under his command about 10,000 men, while the Persians numbered almost 100,000, according to the ancient traditions; at the close of the sharp struggle 6,400 Persians lay dead on the field, while the Greeks had lost but 192. These were buried on the plain, under a mound which may still be seen. When the Persians had fled in terror to their ships, Miltiades chose his swiftest runner, Pheidippides, and dispatched him to carry the news to Athens. Stumbling, panting after his long run he entered the city, gasped out "Rejoice, we conquer!" and fell dead. See FIFTEEN DECISIVE BATTLES.

Centuries later the poet Byron, who had a strong passion for Greek liberty, wrote in his *Don Juan:*

> The mountains look on Marathon
> And Marathon looks on the sea;
> And musing there an hour alone
> I dreamed that Greece might still be free.

MARBLE, *mahr'b'l.* The ancient Greeks became very skilful in carving stone for ornamenting their buildings, and in making statues of the gods and of their heroes. So well was this work done that specimens of old Greek sculpture and architecture are held to-day as models of perfection. They used for this purpose a beautiful white stone, which we know as *marble.* Marble is limestone which has been purified and crystallized by heat *(metamorphism).* The crystals are so small that we cannot see them without a magnifying glass, but so numerous that they give the stone its beautiful appearance when it is polished.

Pure marble is perfectly white; but much of it has been colored by the presence of other minerals, so it is found in almost all colors from white to black. This variation in color is an advantage, since it adapts marble to a great variety of uses. *Pure* marbles are those that are of one color throughout; *variegated* marbles are mottled—that is, they have two or more colors. Some marbles are composed almost entirely of the shells or skeletons of minute animals, and they are known as *fossiliferous* marbles, or marbles composed largely of fossils. *Statuary* marble is pure white, of fine grain and even texture.

Marble is a stone of medium hardness and is easily worked. It takes a high polish, and when protected from the weather is durable. It is highly prized for ornamental work, for finishing interiors of hotels and other large buildings and for stairways. Formerly it was extensively used for headstones, but it has been largely replaced by granite, which is more durable.

The greater part of the marble used in the world is quarried in the United States. The most extensive quarries are in Rutland County, Vermont; others of importance are found in Georgia and Tennessee. It is also quarried to some extent in Colorado, Arizona, California and Alaska. The celebrated Carrara marble comes from Carrara, Italy. Parian marble, so highly prized by the Greeks, was obtained on the Island of Paros, in the Mediterranean Sea. Marbles of a variety of colors are found in Belgium, and a marble of brilliant red color is found on the French side of the Pyrenees Mountains.

Some of the quarries at Rutland, Vermont, are nearly 500 feet deep. All the work of quarrying and shaping the stone is done by machinery, and the greatest care is taken to prevent waste. In Italian quarries the old methods of hand labor and blasting, with their attendant waste, are still employed.

Consult Merrill's *Stones for Building and Decoration;* Renwick's *Marble and Marble Working.*

Related Subjects. The reader is referred to the following articles in these volumes:

Building Stone	Geology
Carrara Marble	Metamorphism
Fossil	Sculpture

MARBLES, little, many-hued, spherical balls of marble, agate, glass, baked clay and other materials, which have been playthings of children for many years. In America, the first day that brings the feel of spring and growing things brings also from the toy boxes those engrossing playthings of the schoolboy—the smooth and shining marbles. For a few weeks, wherever one may look, will be seen a ring of absorbed boys shooting marbles in the game of *little ring, big ring, lagging* or *tossing.* Then suddenly the marbles disappear completely for a year, to give way to the more exciting sports of summer.

Marbles range from one-third of an inch to two inches in diameter, and vary in price, according to size and material, from one cent for a dozen to as much as fifty cents for a single specimen. Bull's-eye and striped marbles are molded in clay, then baked, painted and glazed. Most of the ordinary marbles made in America come from an Ohio pottery, the natural onyx marbles being made in quantities at Akron. Nearly all agate marbles are made at Oberstein, Germany. Most of the common marbles used are manufactured in Saxony, and are made from limestone.

MARCH CALENDAR

Birthdays

1. William Dean Howells, 1837.
   Augustus Saint Gaudens, 1848.
2. De Witt Clinton, 1769.
   Pope Leo XIII, 1810.
3. Alexander Graham Bell, 1847.
   James Lane Allen, 1848.
5. Elizabeth Barrett Browning, 1806.
6. Michelangelo, 1475.
   Philip H. Sheridan, 1831.
7. Luther Burbank, 1849.
8. Richard, Earl Howe, 1726.
9. Americus Vespucius, 1451.
10. Dudley Buck, 1839.
11. Torquato Tasso, 1544.
12. William Lyon Mackenzie, 1795.
    Sir John J. C. Abbott, 1821.
    Thomas B. Read, 1822.
13. Earl Grey, 1764.
14. Johann Strauss, 1804.
15. Andrew Jackson, 1767.
16. James Madison, 1751.
17. Roger B. Taney, 1777.
18. John C. Calhoun, 1782.
    Grover Cleveland, 1837.
19. David Livingstone, 1813.
    William Jennings Bryan, 1860.
20. Charles N. Eliot, 1834.
21. Johann Sebastian Bach, 1685.
22. Anthony Van Dyck, 1599.
    Braxton Bragg, 1817.
    Rosa Bonheur, 1822.
23. Schuyler Colfax, 1823.
24. Egerton Ryerson, 1803.
25. Joachim Murat, 1771.
26. W. E. H. Lecky, 1838.
27. Louis XVII of France, 1785.
28. Raphael, 1483.
29. John Tyler, 1790.
30. John Fiske, 1842.
31. Franz Joseph Haydn, 1732.

Events

1. Jay Treaty ratified, 1796.
   Nebraska admitted to the Union, 1867.
   British blockade of German, Austrian and Turkish ports announced, 1915.
2. Missouri Compromise passed, 1820.
   Bitlis captured by Russians, 1916.
3. Florida became a state, 1845.
   Tax official shot in Manitoba by Louis Riel, 1870.
4. William Penn given grant of Pennsylvania, 1681.
   United States Constitution went into effect and Washington became first President, 1789, though not inaugurated until April.
   Vermont became a state, 1791.
5. The *Monitor* delivered to Federal government, 1862.
6. The massacre at the Alamo, 1836.
7. Providence, R. I., founded, 1638.
   New Brunswick refused to become a member of Canadian Confederation, 1865.
   Discovery of South Pole by Amundsen announced, 1912.
8. Germany declared war on Portugal, 1916.
9. Battle between *Merrimac* and *Monitor*, 1862.
10. Beginning of Battle of Neuve Chapelle, 1915.
11. Sir Alexander Mackenzie died, 1820.
12. Grant made commander of all Federal armies, 1864.
13. Alexander II of Russia assassinated, 1881.
14. Whitney's cotton-gin patented, 1794.
15. Julius Caesar assassinated, 44 B. C.
    Maine became a state, 1820.
    Troops called out by Canadian government to resist Fenians, 1866.
16. West Point Military Academy founded, 1802.
17. British evacuated Boston, 1776.
18. Bismarck resigned, 1890.
    One French and two English battleships sunk in Dardanelles, 1915.
19. Prussian Order of the Iron Cross instituted, 1813.
21. Robert F. Scott and companions died on return from South Pole, 1912.
    Germany's last offensive in War of Nations began, 1918.
22. Fortress of Przemysl captured by Russians, 1915.
23. Patrick Henry's famous oration delivered, 1775.
25. Slave trade abolished by British Parliament, 1807.
    Second rebellion under Louis Riel, 1885.
29. British North America Act passed by Parliament, 1867.
30. First meeting of Congress under new Constitution, 1789.
31. Last American troops left Cuba, 1909.

For Study

Bonheur, Rosa
Buds
Egg
Germination
Grafting
Grass
Kite
Mars
Michelangelo's *David*
Seed
Sistine Madonna
Wind

MARCH QUOTATIONS

1. The stormy March is come at last,
With wind, and cloud, and changing skies;
I hear the rushing of the blast
That through the snowy valley flies.
—*Bryant.*

2. I, the invincible;
March, the earth-shaker;
March, the sea-lifter;
March, the sky-render. —*Crawford.*

3. There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows and in miseries.
—*Shakespeare.*

4. No matter what his rank or position may be, the lover of books is the richest and the happiest of the children of men.
—*Langford.*

5. And I smiled to think God's greatness
flowed around our incompleteness,
Round our restlessness His rest.
—*E. B. Browning.*

6. Through the gaunt woods the winds are shrilling cold,
Down from the rifted rock the sunbeam pours
Over the cold gray slopes and stony moors. —*F. Tennyson.*

7. The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh and whither it goeth. —*Bible.*

8. Many men owe the grandeur of their lives to their tremendous difficulties.
—*Spurgeon.*

9. He ate and drank the precious words,
His spirit grew robust;
He knew no more that he was poor,
Nor that his frame was dust.
He danced along the dingy days,
And this bequest of wings
Was but a book. What liberty
A loosened spirit brings!
—*Dickinson.*

10. Whenever the moon and stars are set,
Whenever the wind is high,
All night long in the dark and wet,
A man goes riding by. —*Stevenson.*

11. March! A cloudy stream is flowing,
And a hard, steel blast is blowing.
—*Barry Cornwall.*

12. If a book come from the heart, it will contrive to reach other hearts; all art and authorcraft are of small amount to that. —*Carlyle.*

13. Loud wind, strong wind, sweeping o'er the mountains,
Fresh wind, free wind, blowing from the sea,
Pour forth thy vials like streams from airy fountains,
Draughts of life to me. —*Mulock.*

14. . . . . Books, we know,
Are a substantial world, both pure and good. —*Wordsworth.*

15. Our Federal Union: it must be preserved. —*Jackson.*
The ides of March are come.
—*Shakespeare.*

16. Slayer of the winter, art thou here again?
O welcome, thou that bring'st the summer nigh! —*Morris.*

17. I hear the wind among the trees
Playing celestial symphonies;
I see the branches downward bent,
Like keys of some great instrument.
—*Longfellow.*

18. Honor lies in honest toil.
—*Cleveland.*

19. Ah, passing few are they who speak,
Wild, stormy month! in praise of thee:
Yet though thy winds are loud and bleak,
Thou art a welcome month to me.
—*Bryant.*

20. . . . . Daffodils,
That come before the swallow dares, and take
The winds of March with beauty.
—*Shakespeare.*

21. I wonder if the sap is stirring yet,
If wintry birds are dreaming of a mate,
If frozen snowdrops feel as yet the sun,
And crocus fires are kindling one by one. —*Rossetti.*

22. Up from the sea, the wild north wind is blowing
Under the sky's gray arch;
Smiling, I watch the shaken elm boughs, knowing
It is the wind of March. —*Whittier.*

23. The pleasant books, that silently among
Our household treasures take familiar places,
And are to us as if a living tongue
Spake from the printed leaves or pictured faces! —*Longfellow.*

24. Whirling the sands about his furious car,
March cometh from afar. —*Simms.*

25. *Impossible*—let me never hear that foolish word again. —*Mirabeau.*

26. Once more, and yet once more,
Returning as before,
We see the bloom of birth
Make young again the earth.—*Perry.*

27. Ah, March! we know thou art
Kind-hearted, spite of ugly looks and threats,
And, out of sight, art nursing April's violets! —*H. H. Jackson.*

28. He only is a well-made man who has a good determination. —*Emerson.*

29. O March that blusters and March that blows . . .
Beauty you summon from winter's snows,
And you are the pathway that leads to the rose. —*Thaxter.*

30. It is nearly an axiom, that people will not be better than the books they read.
—*Potter.*

31. A small number of choice books are sufficient. —*Voltaire.*

MARCH, the "windy month" that ushers in the spring. Its name, which has come down from ancient times, was given it in honor of the war-god Mars, but had no reference to the character of the month, for March in Italy is not the wild, blustering month that it is in more northerly latitudes. The vernal equinox, which marks the beginning of spring, falls on the twenty-first, and the month is thus partly winter and partly spring. In its character, too, it partakes of the traits of both seasons, for its cold and its storms are often broken in upon by days of real spring mildness and sunshine. The special gem of the month is the heliotrope or bloodstone, and the special flower, the violet, but in Canada and the northern part of the United States the violet does not come until after March is past.

History of the Month. In the modern year March is the third month, but in the early Roman calendar it was the first. When Julius Caesar made his reforms in chronology he made it the third month. Though it retained from that time the position he had given it in the calendar year, many of the European countries continued for centuries to regard it as the first of the legal year. England, for instance, did not begin to reckon its legal year from January until after the middle of the eighteenth century. March has had no such variations in length as have some of the other months, its thirty-one days having remained constant from the first.

Popular Sayings. There have been an unusual number of superstitions connected with March, quite without foundation. One, which is still quoted, concerns its weather. "If March comes in like a lion," the saying is, "it will go out like a lamb;" if, on the other hand, the first day of March is balmy and "lamblike," the last day is certain to be stormy. Another old saying declares that the three last days of the month are "borrowed" from April, while a third calls the first three days "blind days" and declares them to be unlucky. It is not so very long ago that farmers held so firmly to this belief that they would not plant seed on those days.

Special Days. There are no general holidays in March, but Texas celebrates the second day of the month as the anniversary of its independence from Mexico. March 4 of every fourth year is of special interest to the people of the United States as the inauguration day of the President.

MARCONI, *mahr ko'nee,* GUGLIELMO (1875-), an Italian electrician, famed as the inventor of one of the marvels of the modern age—practical wireless telegraphy. Through him thousands of lives and property of unknown value have been saved from destruction, for ships at sea, no matter how far from a friendly harbor, may now send news of danger or catastrophe and receive help from vessels within a radius of hundreds of miles. The discoverer of practical wireless telegraphy was born near Bologna, Italy, and was educated at Leghorn and at the University of Bologna. An an early age he showed deep interest in, and remarkable aptitude for, electrical science. When but twenty years of age he had made successful experiments in the transmission of messages by means of waves through earth and air. Then, as from time immemorial, the old adage, "A prophet is not without honor, save in his own country," held true. In spite of successful experiments made at Griffone

GUGLIELMO MARCONI
Through his inventive genius men may send messages 5,000 miles through the air, without wire, poles or other equipment between the terminals.

in 1895, Marconi was unable to interest the Italian government in the wonderful invention his genius had developed. The following year he went to England, where he was well received, and his method was declared feasible, but the prophecy was made that it would never be practiced except for short distances and for limited use.

Then the Italian ministry of marine awoke to a realization of the value of his invention, and it undertook careful experimentation at Spezzia. In 1897 the Marconi Wireless Telegraph Company was founded. Four years later messages were being flashed several thousand miles, over land and sea. Through the use of wireless telegraphy daily newspapers with American and European news are issued on board transatlantic liners.

Marconi has received numerous medals and honorary appointments. In 1915 he became Senator of the Kingdom of Italy, and in June of the same year, when Italy entered the War of the Nations, he took charge of the wireless telegraph operations for his government. In June, 1917, in his capacity of captain in the Italian army, he visited the United States as a member of the Italian commission to confer on the war.

MARCO POLO, *mahr'ko po'lo.* See Polo, Marco.

MARCUS AURELIUS, *mahr'kus aw re'li us.* See Aurelius, Marcus.

MARDI GRAS, *mahr de grah',* or **SHROVE TUESDAY,** the last one of the days of revelry which are celebrated in Roman Catholic countries immediately before Lent. The name is a French expression meaning *fat Tuesday,* and refers to the French custom of leading a fat ox through the streets during the festival parade. Rome is the principal European center of the Mardis gras festival.

In America it has been celebrated with great splendor by the people of New Orleans since 1857. In that city the merrymaking begins at daybreak, and all the day the streets are filled with gay revelers in masques and masquerade costumes. One may see cowboys, Indians, negro minstrels, toreadors, Chinamen, Turks, princes in velvet and satin, clowns in motley array, and even mock policemen. Men, women and children join in the fun, and the city is turned over to "King Rex and his mystic crew of Comus."

A brilliant feature of both the day and evening celebration in New Orleans is an elaborate parade, including a procession of floats, or stages mounted on wheels, on which characters pose in tableaux representing legends, fiction or historical events. The Royal Parade Ground (Canal Street) is made splendid with flags, bunting, banners, streamers and fringes, and at night it becomes a gorgeous spectacle of electric illumination. After the evening parade a grand festival ball is held in the Old French Opera House, and it is not until midnight that the sounds of revelry pass into silence. The following day, Ash Wednesday, ushers in the season of Lent.

MARE ISLAND, an island two miles long, at the east end of San Pablo Bay, twenty-five miles north of San Francisco, Cal. It is separated from the city of Vallejo by a strait half a mile wide, and there is ferry connection with that city. A United States navy yard, on the west shore of the bay, is the most important of the Federal naval yards on the Pacific coast. War vessels are built there, and there are ordnance yards, marine barracks, dry docks, a hospital and an observatory. A lighthouse stands on the southern extremity of the island.

MARENGO, *ma ren'go,* Battle of, a decisive battle between the French and Austrians, won by Napoleon, June 14, 1800. In 1798, taking advantage of Napoleon's absence in Egypt, England, Russia and Austria formed an alliance against France. Returning in 1799, Napoleon found that though Russia was again friendly, the success of the alliance was undermining his power. Accordingly, he mustered 40,000 men, and rejecting the idea of advancing by sea on Italy, which was then in Austria's hands, he took the more secret and dangerous route across the Alps through the Saint Bernard Pass. The battle of Marengo began in the morning, and by noon it appeared that the French were beaten; but Napoleon fought stubbornly until mid-afternoon, when reënforcements arrived. The day was saved; Napoleon lost General Desaix, one of the few whom he loved and trusted, but he gained Genoa, Piedmont and Milan, and his prestige in France was again secure.

MARÍA CHRISTINA, *ma re'a kris te'na* (1806-1878), a queen of Spain, the daughter of Francis I, king of the Two Sicilies, and grandmother of King Alfonso XIII. She was the fourth wife of Ferdinand VII, and bore him a daughter, Isabella II, who, in virtue of a proclamation issued before her birth, became heiress to the kingdom. Upon the death of Ferdinand, María Christina was appointed guardian of the young queen. Soon a civil war

broke out, because of the ambitious designs of Ferdinand's brother, Don Carlos, who aspired to the throne. The queen mother took very little interest in the affair, preferring to bestow her attentions upon one of her royal bodyguard, whom she married in 1833. Because of this she became exceedingly unpopular, and was obliged to flee to France. In 1848 she returned, but her actions became so distasteful to the patriotic party in Spain that in 1854 a revolution expelled her from the country. In 1864 she again returned, only to be driven into exile again four years later. She died at Le Havre in 1878. See ALFONSO XIII.

MARIA LOUISA, *ma ri' a lo e' za* (1791-1847), the second wife of Napoleon Bonaparte, was the daughter of Emperor Francis I of Austria. Her marriage with Napoleon was solemnized in 1810, after his divorce of Josephine (see JOSEPHINE, MARIE ROSE). In 1811 she bore him a son, who was hailed as king of Rome. This prince, who is known in history by the empty title of Napoleon II, died at the age of twenty-one. On the overthrow of Napoleon, not being permitted to follow him into exile, Maria Louisa and her son took up their residence at Schönbrunn, near Vienna. In 1816 she received the Italian duchies of Parma, Piacenza and Guastalla, which she governed till her death.

MARIA LOUISA
She became the wife of Napoleon Bonaparte for reasons entirely political.

Consult Guerber's *Empresses of France;* Cuthell's *An Imperial Victim.*

MARIA THERESA, *ma ri' a teh re' sa* (1717-1780), one of the most important figures in European wars and politics during a critical period of the eighteenth century. She was the daughter of Emperor Charles VI, the last male heir in the direct line of the House of Hapsburg. By the Pragmatic Sanction, a settlement which was guaranteed by the principal states of Europe, her father appointed her heiress to his hereditary dominions. Upon his death, in 1740, she became queen of Hungary and Bohemia and Archduchess of Austria. Later she declared her husband, Francis of Lorraine, joint ruler. On her accession Prussia, Spain, Bavaria and France claimed portions of her dominions, which resulted in the War of the Austrian Succession (see SUCCESSION WARS). The young queen fled to Pressburg, where she threw herself upon the sympathy of her Hungarian subjects. The war continued over seven years, terminating with the peace of Aix-la-Chapelle in 1748, whereby Silesia was ceded to Frederick II of Prussia. However, the titles of the queen were fully recognized, and in 1745 her husband was elected Holy Roman emperor. See FRANCIS (Holy Roman Emperors), subhead *Francis I.*

MARIA THERESA
One of the most influential of eighteenth-century Europeans.

During the peace which followed, Maria Theresa, with the aid of her husband and her able minister, Kaunitz, introduced many financial reforms, greatly diminishing the burdens of her subjects, while agriculture, manufacture and commerce were encouraged. But the loss of Silesia rankled deep in her mind, and in 1756, with France as an ally, she renewed her contest with Prussia, bringing on the Seven Years' War (which see). This again reduced Austria to a state of exhaustion, and Maria failed to recover her lost province of Silesia, but on its conclusion she successfully renewed her efforts to promote national prosperity. Her son Joseph was elected Holy Roman emperor in 1765, upon the death of her husband, and to him she gave the management of the military affairs of her realm. In 1772 she joined in the dismemberment of Poland, obtaining Galicia for Austria, and in 1777 she also obtained Bukowina from Turkey. Of her sixteen children, ten survived her, one of whom was the beautiful Marie Antoinette, wife of Louis XVI of France.

Consult Bright's *Maria Theresa;* Moffatt's *Maria Theresa.*

MARIE ANTOINETTE, *mah re' aN twah net',* JOSEPHE JEANNE (1755-1793), a beautiful queen of France, whose tragic fate is a part of the story of the French Revolution. She was the youngest daughter of the Emperor Francis I and Maria Theresa of Austria. From the cradle her ambitious mother destined her to be the

queen of France, and at the age of fifteen Marie Antoinette was married to the dauphin, afterwards Louis XVI. As dauphine, the stilted atmosphere of the court had wearied her, and as queen she determined to escape from it. She preferred the liberty of action to courtly etiquette. Her beauty excited jealousy, and her impatience with court conventions and her interference in political matters were looked upon as a source of danger by her subjects. She was sentimental, rash and determined to enjoy her young life to the full, despite the deceitful, wearisome and empty grandeur of the court life so odious to her.

MARIE ANTOINETTE
This royal woman died by the guillotine, a victim of the masses whom she had helped excite to the frenzy and delirium of the French Revolution.

The Petit Trianon (the Little Château) at Versailles, the gift of Louis XVI to his queen, is sacred to the memory of Marie Antoinette. In the surrounding gardens and the Swiss chalet the young queen sought novelty and relaxation when her ministers thwarted her on all sides and her subjects scowled menacingly because of her extravagant pleasures—she was called *Madame Deficit* and *Madame Veto*—and as a result, in 1789, an infuriated, hungry mob, composed chiefly of women who had been worked up to a frenzy by slanderous stories, attacked Versailles. The queen alone maintained her courage and calmed the crowd. That day the royal family left Versailles. The French Revolution was now at its height. When they were practically prisoners in the Tuileries, the royal palace in Paris, it was Marie Antoinette who advised the flight of the royal family in June, 1781, which ended in their capture and return to the capital.

Ere long the palace of the Tuileries was stormed. Louis XVI was tried and quickly executed, the boy prince was torn from the arms of his mother, and the queen was sent to prison like a common criminal, where she suffered insult and brutality at the hands of her guards. She bore herself with calmness and dignity during the terrible days of her trial, and on October 16, 1793, was guillotined in Paris. The Obelisk of Luxor, in the Place de la Concorde, now marks the spot where Marie Antoinette and Louis XVI, the last royal couple of France before the Revolution, paid the price for their extravagances and those of Louis XIV and XV. See FRENCH REVOLUTION; LOUIS, subhead *Louis XVI.* R.D.M.

Consult Bicknell's *The Story of Marie Antoinette;* Beloc's *Marie Antoinette.*

MARIETTA, *may ri et' a,* OHIO, is the oldest city of the state. It is the county seat of Washington County, picturesquely located on the Ohio River, where it is joined by the Muskingum. The city is 115 miles southeast of Columbus and eighty-one miles southwest of Wheeling, on the Baltimore & Ohio, the Marietta, Columbus & Cleveland, and the Pennsylvania railroads. There is interurban electric service and river traffic with Pittsburgh, Cincinnati and other Ohio River cities. The population, which in 1910 was 12,923, was 14,785 in 1916, the increase being partly due to annexation of territory in 1912.

Marietta College, a coeducational institution, is situated here, and the city has a fine courthouse, Federal building, armory, large public library noted for works on the history of the Northwest, Carnegie Library (constructed in 1916), Y. M. C. A. building, two hospitals and a Children's Home and Old Ladies' Home.

Surrounding Marietta is a large oil territory; the annual county product is 1,300,000 barrels. Other natural resources are coal, gas, iron, clay and stone. The city has more than fifty manufacturing plants, which employ 2,000 men; chief among the articles produced are iron and steel, refined petroleum, harness, chairs, safes and cabinets, paints, chemicals, stoves and glass.

Marietta was founded in 1788 by a company from New England under the leadership of General R. Putnam, and was named in honor of Marie Antoinette. In the same year the Northwest Territory (which see) was organized here. Marietta was first incorporated as a town in 1800. Earthworks of the ancient mound builders are among the numerous historical features of the city. J.H.W.

MARIGOLD, *mair' i gold,* an old-fashioned, sturdy flower of European and American gardens—truly old-fashioned, for Shakespeare knew it as "The marigold that goes to bed wi' th' sun, and with him rises weeping." Shakespeare had probably seen the big drop of dew in the folded petals early in the morning. There are many kinds of marigolds, all of some

shade of yellow or orange. The so-called African and French marigolds both originated in Mexico, and were developed in France from little, wild blossoms to exquisite flowers. The English *corn marigold* grows wild in the cornfields. All have a peculiar strong, but pleasant, odor. They, with the sunflowers, asters, dandelions and others, are called *composite,* for they combine many very small flowers grouped around a large center. The marigold plants grow from one to two feet high. The leaves are feathery. They are annuals, but grow without much care and bloom well for a long period. See ANNUALS.

Open afresh your round of starry folds,
Ye ardent marigolds!
—KEATS.

MARINE CORPS, *ma reen' kohr,* a corps of sea soldiers specially trained for naval warfare and serving for the most part on board ship. The position of the marines, who were at first regarded as neither soldiers nor sailors, rendered them subject to undeserved ridicule, for their place in the military and naval scheme was little understood. They are now highly esteemed as the "soldiers of the navy."

Only in the British and the United States navies are the marines a specially organized force performing specified functions on board ship. The word *marine* is sometimes used by other powers, but in other countries marines are only used for coast defense or to garrison forts and colonies. The marines in the British service are two corps, the Royal Marine Artillery, and the Royal Marine Light Infantry. Their duties are military, the sailors manning the ship while the marines fight or form landing parties.

The United States marines date from the foundation of the navy, and are regarded as one of the most efficient bodies of men in the forces. On board ship they perform sentry and orderly duties and police duties. In many ships they serve the guns and act as riflemen. The marines are always sent first when a landing party is required; in whatever part of the world help is asked of a United States war vessel, the marines are landed. For years they have helped to keep the peace in Central American countries and in islands of the sea, and they performed important work in Mexico in 1914. During the American occupation of Vera Cruz, in that year, parties of marines were sent to police the town, and in the fighting which preceded the occupation of the city they lost seventeen of their number. Candidates for enlistment as marines must be between the ages of eighteen and thirty-five. The full peace strength of the corps is 646 officers and 15,000 noncommissioned officers and men. In case of emergency that number may be increased. A brigade of three battalions of marines did good service in the Philippines in 1899. The corps badge or device is a globe resting on an anchor surmounted by an eagle. In the Battle of Belleau Wood and at Chateau Thierry, in 1918, American marines turned the tide of the War of the Nations and gave renewed courage to the war-worn allied armies.

Consult Collum's *The History of the Marine Corps;* Cooper's *History of the Navy.*

MARINETTE, *mair i net',* WIS., the county seat of Marinette County, claimed to be the most important lumber center of the Northwestern states. In 1910 the population was 14,610, Scandinavians predominating in the foreign element. The city is situated in the northeastern part of the state, on Green Bay, at the point where the Menominee River, which separates Michigan from Wisconsin, discharges into the bay. Menominee, Mich., across the river, is connected with Marinette by bridges and by steam and electric railways. The city of Green Bay is forty-nine miles southwest, and Chicago is 262 miles south. Besides railway service of the Chicago & North Western, the Chicago, Milwaukee & Saint Paul and Wisconsin & Michigan railways, the city has steamer connection with all lake ports of importance. Marinette was settled in 1857, was incorporated as a city in 1887, and named for Marinette, an Indian woman. The area exceeds five square miles.

Marinette has a good harbor and a large lake commerce; the river, on which lumber is brought down from the forests in Michigan and Wisconsin, is an important factor in the development of the lumber industry. The large lumber mills lead in the industrial establishments, which include manufactories of furniture, pails, boxes, brooms, paper, pulp, flour, steam-threshing machines, cooperage supplies, gas and traction engines. The value of the annual output of the various products is estimated at $2,500,000. Notable buildings are

the Federal building, erected in 1907, a public library with 15,715 volumes, the gift of Senator Stephenson, and Our Lady of Lourdes' Institute. C.R.J.

MA'RION, Francis (1732-1795), one of the most daring of colonial leaders in the American Revolution. His grandfather was a Huguenot refugee whose independent and brave spirit was inherited by the boy. As lieutenant, he commanded a troop of colonists against the Cherokee Indians in 1761.. In 1775 he was a member of the provincial congress. He entered the army as captain after the Declaration of Independence, was soon raised to the rank of major, and in 1780 was made brigadier-general of the South Carolina state troops. This command was not strong, for his men were poorly equipped and insufficiently fed. However, with their help he succeeded in making communication impossible for British posts in the Carolinas, took many prisoners, relieved surrounded troops, and took part in important victories, notably at Nelson's Ferry and Eutaw Springs. The British officer, Colonel Tarleton, who was especially ordered to take him, said he could not catch the "old swamp fox." After the war Marion was made commander of Fort Johnson, and was for several terms a member of the state senate of South Carolina.

MARION, Ind., the county seat of Grant County, is situated northeast of the geographical center of the state, on the Mississinewa River (west fork of the White River). Indianapolis is seventy-three miles southwest, Chicago is 157 miles northwest, and Detroit is 234 miles northeast. Four trunk lines serve the city—the Cleveland, Cincinnati, Chicago & Saint Louis; Pennsylvania; the Toledo, Saint Louis & Western, and the Chesapeake & Ohio railways; interurban electric lines connect with Indianapolis and other cities. Marion was settled in 1832, was incorporated in 1887 and was named in honor of General Francis Marion, a Revolutionary leader. The population increased from 19,359 in 1910 to 19,834 in 1916 (Federal estimate); ninety per cent are Americans. The area is nearly five square miles.

Through excellent transportation Marion is a commercial center of importance, the principal articles shipped being the products of its own manufacture and of the surrounding agricultural region. These include corn, wheat, oats, cattle, hogs, sheep, horses, glass, flour, linseed-oil, paper, pulp, bricks, foundry products, shoes and gasoline motors. The railway tonnage shipped is nearly a thousand tons daily. Natural gas found in the vicinity and water power furnished by the river increase the manufacturing interests. The city has a $125,000 Federal building, erected in 1908, a Masonic Temple, a fine courthouse, and Y. M. C. A. and Y. W. C. A. buildings. Beside its public schools it has Marion Normal Institute, a business college and a Carnegie Library. Three miles south of the city is located a National Soldiers' Home, erected at a cost of $1,500,000. H.E.T.

MARION, Ohio, the county seat of Marion County, is forty-five miles north of Columbus, the state capital, and seventy-five miles southeast of Toledo. It is on the Cleveland, Cincinnati, Chicago & Saint Louis, the Hocking Valley, the Pennsylvania and the Erie railroads, and has electric lines to Mansfield and Columbus. The area of the city is about six square miles. The population in 1910 was 18,232; in 1916 it was 23,430 (Federal estimate).

The city contains a Federal building, erected in 1910 at a cost of $90,000, a Carnegie Library, an Elks' Home, three private hospitals, a normal school, an Old Ladies' Home and the Marion County Children's Home. The importance of the city's steam shovel manufactories has given Marion the name of "Steam Shovel City." One factory employs 2,000 men, and its annual output is valued at $10,000,000. Other manufactures are iron, silk, pianos, racing sulkies, dredges, farming implements and steam engine and boiler works. Near the city are large limestone quarries.

Marion was settled in 1815, incorporated in 1820 and became a city in 1890. C.B.H.

MARIUS, *may'ri us,* Caius (about 156-86 B. C.), a great Roman military leader and a fearless warrior, before whom it is said men dropped their swords in terror. He was born of obscure parents and was uneducated, rude and arrogant. He first won military distinction in Spain, during the Numantine War, and from that time his rise was rapid. He was elected tribune, and soon acquired power and social standing by his marriage with Julia, aunt of Julius Caesar. In 114 B. C. he cleared Further Spain of robbers, and in 107 was elected consul and intrusted with the conduct of the Jugurthine War, which he successfully ended.

Having become the most conspicuous officer in the Roman army, Marius was called to the consulship the second time and was sent to defend the Roman dominions against a horde of German barbarians who had broken into Gaul. These he annihilated in the famous two-

days' battle of Aquae Sextiae. He was elected consul for the third, fourth, fifth and sixth times, as it was deemed that he alone could save the republic. He was classed with the gods by the people of Rome. Then his popularity declined, because of his association with disreputable leaders. He attempted to remove his patrician rival, Sulla, from his command in the Mithridatic War, and a civil war resulted, during which Marius fled to Africa. Afterwards, during the absence of Sulla, he returned to Rome and won a decisive victory over his enemy. He was then elected to the consulship the seventh time, but died after serving seventeen days. See SULLA, LUCIUS CORNELIUS.

MARJORAM, *mahr'jo ram,* a shrub or herb which the Romans and Greeks wove into wreaths to crown the newly married. It is found in the Mediterranean region and in Great Britain, and has also been naturalized in parts of the United States and Southern Canada. It grows from one to two feet in height, has woody stems, and its leaves are small and pointed and pale green in color. The flowers are two-lipped and of a pinkish white, and the seeds are small. Sweet marjoram, the cultivated variety, has an aromatic taste and pleasing odor, and is highly esteemed as a seasoning in cookery.

MARK, a silver coin which is the monetary unit of the German people, as is the dollar in the United States and Canada. It weighs .3982 grams and is equal in value to 6.146 grains of gold nine-tenths pure. Its value in United

THE GERMAN MARK
About the size of the 25-cent piece of Canada and the United States, and valued at nearly 24 cents.

States and Canada money is 23.8 cents, usually, however, estimated at twenty-four cents. The mark is equivalent to 100 *pfennigs.* Gold coins valued at ten and twenty marks are issued. The term *mark* was originally used in Europe to designate eight ounces of gold or silver.

MARK, SAINT, an energetic evangelist in the time of Christ, who included not only his own teachings, but also those of Peter in his Gospel, which forms the second book in the New Testament. His home in Jerusalem, where his mother Mary lived in comfortable circumstances, was in his youth a gathering place for Christians. He accompanied Paul and his cousin Barnabas on their first missionary journey, but on account of a disagreement left them at Perga and returned to Jerusalem. Later he sailed for Cyprus with Barnabas to resume evangelistic work. For ten years afterwards nothing was heard of him, until suddenly he joined Paul at Rome; by that time their misunderstanding had passed. From that time on until his death Mark was associated with both Paul and Peter in their missionary work, and tradition says that he was the founder of the church at Alexandria. The time and place of his death are unknown, but the important fact in his life is that his association with the chief apostles fitted him to write the gospel which bears his name. See GOSPELS.

MARK ANTONY, *an'to ni.* See ANTONY, MARK.

MARKHAM, *mahr'kam,* EDWIN (1852-), an American poet and lecturer, author of one of the best appreciated of modern poems, *The Man with the Hoe,* which was inspired by Millet's painting on the same subject. Markham was born in Oregon, and when five years old was taken by his parents to California. There he passed his boyhood, working as a farmer, blacksmith and cattle and sheep herder. He studied at the San José Normal School and at Christian College, Santa Rosa, and later became a school superintendent. From an early period he had written verse for California papers, winning thereby considerable local fame, but the publication of his *Man with the Hoe,* in 1899, brought him world-wide notice. So great was the success of this poem, which was acclaimed "the battle-cry of the next thousand years," that he decided to try his fortunes in the East, and since 1899 has lived in or near New York City.

Markham's other important writings include *Lincoln, and Other Poems; The Poetry of Jesus,* a series of essays; *The Social Conscience* (a baccalaureate sermon for Leland Stanford University, 1897); and a series of magazine articles covering the problem of child labor, entitled *The Hoe-Man in the Making.*

MARKS'MANSHIP. There is a very well known and proverbial saying that the one most proficient in anything is he who "hits the bull's-eye." Now to hit the bull's-eye one must be a marksman. To become one it is abso-

lutely necessary to make up one's mind to work with a determination to succeed.

The rifle is the first weapon to be considered in the art of shooting. The beginner should use a rifle that has the plain, open sights. The gun containing the hair-trigger and peep-and-globe sights should be avoided in preliminary marksmanship.

After you own a rifle, become acquainted with it before you begin shooting. Know your gun and know yourself. Take hold of the rifle with the right hand, gripping the stock firmly. Make sure the grip is from center of the palm, so there will be no slip of the stock and so one can get a long reach with the index finger. The beginner must first try to obtain the lift of the gun without using a support to raise it to the shoulder. After the rifle placement, with the gun butt in the arm socket, raise the right elbow to a position parallel with the shoulder edge. Then grasp the rifle with the left arm extended. Once in this position, place the gun so that the fore stock may be gripped firmly by the left hand. Press the gun firmly against the shoulder, and follow this pose with a reach for the trigger. The effort must result in the first joint of the index finger clutching the trigger. Then take aim. Be sure to stand erect. Take care that the body is balanced evenly. Do not use a rest. As you take aim hold the breath and concentrate the mind upon the target. Pull the trigger gently. Do not jerk the rifle, for a hard pull will make the shot go wild. By breathing through the nose, as breath should be drawn, the beginner can avoid giving the rifle a slight momentum, and is thereby enabled to make a steadier shot. Always aim at the lowest part of the bull's-eye when practicing upon a target.

In starting early practice one should at no time shoot at anything except stationary objects. Once the off-hand position is mastered the beginner then can take up the other position at his own inclination.

Do not become discouraged at first; constant practice makes perfect the art of shooting. As one continues in the work he will learn more rapidly how to become proficient with the gun than he can through continual instruction from any master or expert. In using a military rifle commence with shooting-gallery ammunition at 100 feet range. After having attained perfection with this ammunition, use full charges. Always prepare yourself for the recoil.

To become a perfect marksman, which is the ambition of most boys, one must be much out in the open air; he must fill his lungs with oxygen that will help build up his system. Marksmanship goes hand-in-hand with health. No proficiency can be obtained with any gun unless the person be physically qualified to become expert in the art of shooting. Temperate habits and fresh air are highly essential in keeping the eyes clear, the mind refreshed, the heart beating regularly, and the nerves as steady as steel. J.D.L.

MARK TWAIN. See CLEMENS, SAMUEL LANGHORNE.

MARL, a term rather loosely applied to certain mixtures of clay and carbonate of lime. Marl is a valuable fertilizer when its various constituents are suited to the requirements of a given soil, and this is its chief industrial use. Slaked lime, which has a quicker action, is an efficient substitute for marl. Shell marl is a soft, crumbling deposit of the remains of shell-fish and water plants found on the bottoms of lakes and ponds. When such deposits become stone, they are known as fresh-water limestone. See FERTILIZER.

MARLBORO, *mahrl'bur o,* MASS., a manufacturing city in Middlesex County, in the eastern part of the state, twenty-eight miles west of Boston and fifteen miles northeast of Worcester. The main automobile route from Boston to New York state passes through Marlboro and Worcester. Two great railway systems serve the city, the New York, New Haven & Hartford and the Boston & Maine. Electric lines connect with cities south, west and north. French, Irish and Italians comprise two-thirds of the population, which increased from 14,579 in 1910 to 15,187 in 1916 (Federal estimate). The area exceeds twenty square miles.

In the great variety of manufactures in Marlboro shoes and boots lead. Shoe-making machinery, automobiles and tires, electrical machines and accessories, bicycles, carriages, wagons, woodenware, cigars, miners' lamps and machine-shop products are also included in its output. The city has a fine city hall, a post office, a $65,000 high school, a public library and Saint Ann's Academy. Lake Williams, a quarter of a square mile in size, is near. Wellesley College, for girls, sixteen miles distant, is connected by a trolley line with Marlboro.

The first settlement was made in 1656 by a colony from Massachusetts. In 1660 it was incorporated as a town, and in 1890 it became a city. It was named for Marlborough, England.

During King Philip's War in 1676 the town was almost completely destroyed by the Indians. From the original township, Westboro was founded in 1717, Southboro in 1727, and Hudson in 1866. F.L.G.

MARLBOROUGH, *mahrl'boruh,* or *mawrl'bruh,* JOHN CHURCHILL, Duke of (1650-1722), one of England's greatest generals. Born at Ashe in Devonshire, and educated at Saint Paul's school, London, he entered the army very early and first saw service at Tangier, fighting against the Moors. Under the great General Turenne he served against the Netherlands, in the first battles in which musketry and artillery entirely replaced the old-style weapons. The promotion of Churchill was rapid, and though he showed ability his rise was mainly due to the influence of his sister. His marriage to Sarah Jennings, lady-in-waiting to Princess Anne, secured him the favor of that princess, and when the Duke of York ascended the throne as James II, he became more powerful and was placed in charge of the troops to suppress the Monmouth rebellion, which he did most thoroughly.

As the Roman Catholic inclinations of James II became more clearly indicated, Churchill gradually withdrew from important affairs and was one of the first to join William III when he was invited to accept the English crown. William realized Churchill's influence with the army, so he created him Earl of Marlborough and gave him important commands. On the outbreak of the War of the Spanish Succession William placed him in command of the British troops in the Netherlands.

On the death of William the Princess Anne came to the throne, and Marlborough was in royal favor. The Duchess of Marlborough dominated the queen, and Marlborough felt that his power was on a solid basis. He was appointed captain-general of the Dutch forces, and he conducted some remarkably successful operations against the French, driving them out of Liége and other towns, for which service he was created Duke of Marlborough. The French and Bavarian lines at Donauworth were stormed, and he effected a union with the forces of Prince Eugene of Austria, in conjunction with whom he obtained the decisive victory of Blenheim. Later followed the victories of Ramillies, Oudenarde and Malplaquet. The road to Paris was open, but Marlborough had lost his influence at home and could not follow up his advantages. His haughty wife had offended the queen, who at last asserted herself and dismissed the duchess from the court. Marlborough was relieved of his command and accused of embezzlement of public money. Deprived of his offices, he yet had a fortune, granted him for his military services, and he retired from public life.

Although the character and motives of Marlborough have been strongly assailed, his military genius has never been impeached. His final downfall was not due to any lack of ability on his part, but to the duchess's inability to curb her haughty temper. After Queen Anne's death in 1714, Marlborough was again appointed captain-general by George I, but he took no active part in affairs and remained in retirement on his estate. F.ST.A.

Consult Green's *History of the English People;* Alison's *Military Life of the Duke of Marlborough.*

Related Subjects. The reader is referred to the following articles in these volumes:

Anne	Monmouth, Duke of
Blenheim	Succession Wars
James II	William III

MARLOWE, *mahr'lo,* CHRISTOPHER (1564-1593), the first English writer of great tragedies and the first to use the form of blank verse. He blazed the trail for Shakespeare, who was soon to follow. Marlowe was of humble parentage, his father being a shoemaker in Canterbury; his education was completed at Cambridge. After graduation, he went to London, where he immediately began to write plays. He was associated in college days and later with brilliant men, leaders in literary and dramatic art and was one of what was called Sir Walter Raleigh's School of Atheism. He was an original and brilliant thinker, no doubt urged to extremes by the stupid dogmatism of his time. He met his death in a quarrel. His greatest works are *Tamburlaine the Great, Edward II, Doctor Faustus* and the *Jew of Malta.*

MARLOWE, *mahr'lo,* JULIA (1870-), known in private life as Mrs. Edward Hugh Sothern, is an American actress of unusual personal charm. Her specialty was in Shakespearean rôles, such as Portia in *Merchant of Venice,* Juliet in *Romeo and Juliet,* and Rosalind in *As You Like It.* After 1904 she appeared almost continuously in these rôles for ten years with Mr. Sothern, whom she married on August 17, 1911.

Although born in Cumberlandshire, England, Julia Marlowe, whose real name was SARAH FRANCES FROST, moved with her parents, at the age of five, to America, and settled in Kansas.

Later the family moved to Cincinnati, where the little girl attended the public schools until she was twelve, when she joined a juvenile opera company, which presented *Pinafore, Chimes of Normandy* and other light operas. After playing a child's part in *Rip Van Winkle,* she left the stage to study for three years in New York, and in 1888 made her début at Boston as Parthenia in *Ingomar.* From that time on her success was assured. In addition to her many Shakespearean rôles, she appeared as Barbara Frietchie in Clyde Fitch's play of that name, Highland Mary in *For Bonnie Prince Charlie,* and in *When Knighthood Was in Flower.* In 1894 she married Robert Tabor, who was then her leading man, but six years later she divorced him. After ten years of work with E. H. Sothern, she retired from the stage in August, 1915, on account of ill health. See SOTHERN, EDWARD H.

JULIA MARLOWE

Consult Strang's *Famous Actresses of the Day in America.*

MARMORA, *mahr'mo ra,* SEA OF, an oval body of water, once called *Propontis,* lying in Eurasia between the Black and Aegean seas. It is connected with the former on the northeast by the Strait of Bosporus, and with the latter on the southwest by the Dardanelles (which see). It is about 160 miles long, its greatest width is less than fifty miles, and its area is about 4,500 square miles. It is more than twice as large as Prince Edward Island, and somewhat smaller than Connecticut. The sea forms a waterway for vast commerce. It contains several islands, among them Marmora, noted for the beautiful marble and alabaster obtained from its quarries. The great city of Constantinople lies at the northeastern extremity of the Sea of Marmora, and both came into world-wide notice in 1915, during the War of the Nations, when the Allies, particularly England and France, sought entrance into the sea by way of the Dardanelles. This spectacular campaign, which had Constantinople as its objective point, was abandoned after nearly a year of futile fighting (see WAR OF THE NATIONS).

LOCATION MAP

MARMOSET, *mahr'mo zet,* the family name of the smallest of the monkeys, which are not larger than a squirrel or a half-grown kitten. They live in South America. Their coat is long, soft fur, beautifully colored. Some marmosets have tufts of hair on the top of their ears, and the *silky marmoset* has a great pompadour of long fur. Their tails are long, covered with fur, and ringed with bands of black and gray. Although this little creature lives in trees, it does not use its tail to hold to the branches, as do most monkeys, for it is too short. The marmosets eat the fruits and insects they find in the trees. The most common marmoset, called *ouistiti,* is a popular South American pet and thoroughly enjoys being cared for. It cannot live, however, when taken to cool climates.

MARMOT, *mahr'mot,* a small member of the ground squirrel family, which resembles the rat in form and habits; in the arrangement of its teeth, however, it is like the squirrels. The common marmot is a native of the Alps, the Pyrenees and the more northern mountains of Europe. Marmots are about the size of rabbits, and have short legs and tails and thick bodies. Their fur is grayish-yellow, becoming brown toward the head. Their food consists of insects, leaves and roots. They dig large burrows and provide two entrances, and in them they spend the winter.

THE MARMOT
About one-twelfth actual size.

The prairie dog and woodchuck of North America are species of marmot, but they have more solitary habits than their European cousins. See GROUND HOG.

MARNE, *marn,* the largest tributary of the River Seine, rises in the plateau of Langres,

flows with many turnings northwest and then westward across the eastern part of France and empties into the Seine about four miles above Paris. It is a rapid stream and supplies power to many mills; it has been canalized and dredged until it is navigable for 226 miles and connects by canal with the Rhine at Strassburg.

LOCATION MAP
It was on the Marne that the German drive on Paris was halted, and the whole tide of war in the world struggle was changed.

The First Marne Battle, one of the early encounters of the War of the Nations, was really not a single battle, but a series of desperate engagements lasting from September 6 to September 12, 1914. The battle front was over 140 miles long, from near Paris to Verdun, and more than two and one-half million men, the largest number up to that time ever engaged in one battle, took part. The Germans were only thirty-five miles from Paris; they had driven the French and the few English in confusion for over two weeks, but at a vital moment the French and English turned upon their pursuers. In the six days following the Germans were driven back to their line of forts on the Aisne River.

The Second Battle. Again in 1918 the Marne was the scene of most decisive engagements, which resulted from Germany's last desperate attempt to reach Paris. The final German drive began March 21, 1918, and it progressed with amazing rapidity until June, when it was halted at the Marne, this time only thirty-one miles from Paris. American troops had the honor of bringing the Germans to a full stop, whereupon all the allied armies hammered the enemy unceasingly until November, when, almost on German soil, the Germans acknowledged defeat. See WAR OF THE NATIONS.

MARQUE AND REPRISAL, *mark, repri'zal,* LETTER OF, a written commission or license granted by the supreme power of a nation at war to private persons who own ships, authorizing them to pass beyond the three-mile international boundary and conduct hostilities against the enemy. Such vessels were known as *privateers,* and the prizes captured were divided among the owners of the vessels, their captains and their crews. Warring nations with but small navies resorted to this method as early as the sixteenth century, but by the Treaty of Paris in 1856 letters of marque were abolished by the nations of Europe. The United States declined the invitation to join this arrangement, but it abandoned privateering. At the beginning of hostilities between the American government and Germany, in April, 1917, the former pressed into service many large, private yachts to hunt submarines, but they became government vessels and their private character was lost. They were, therefore, not privateers.

MARQUESAS, *mahr ka'sas,* **ISLANDS,** a group of volcanic islands belonging to France, lying in the Pacific Ocean about midway between South America and Australia, in the same latitude as the northernmost point of the latter continent. They are eleven in number, and have a total area of 480 square miles. Only six of the islands are inhabited, and their combined population, which is slowly decreasing, is less than 3,200. The Marquesans, who are physically a superior group of the Polynesian race, have adopted the customs of civilization and the teachings of Christianity. They are skilful producers of carved and ornamented axes and oars, cocoanut slings, carved clubs and other specimens of handicraft, and subsist chiefly on breadfruit, which grows abundantly on the islands.

The southern group of islands was discovered in 1595 by Mendana de Neyra, a Spanish navigator; the northern group was sighted in 1791 by an American traveler who named his discovery the Washington Islands. Commodore David Porter, of the *Essex,* proclaimed the islands United States territory in 1813, but the government neglected to claim them; they were far from America's sphere of influence. In 1842 they were annexed to France.

MARQUETTE, *mahr ket',* JACQUES (1637-1675), a French missionary and explorer in America. He was born at Laon, became a Jesuit, and in 1666 was sent out to Canada by his Order as a missionary. For two years he lived with another missionary, learning the customs and language of the Indians, and in 1668 was sent to the upper lakes. He worked at Sault Sainte Marie and at Mackinaw, but in 1673 was instructed to give up his mission there and accompany Joliet on his exploration of the Mississippi River. By way of Lake Michigan, Green Bay, Fox River and Wisconsin River, with portages between, they reached the Mississippi, which they descended to the mouth of the Arkansas. Fearing to go further on account of

the Spaniards, they returned by way of the Illinois River, having spent four months on the journey.

Marquette's health was very poor, and on an expedition which he undertook, the next year, to found a mission among the Illinois Indians, he grew steadily worse. On the return journey he died, near the present site of Ludington, Mich. Several places claim the distinction of being his burial place, but beyond doubt his remains lie at Saint Ignace, Mich., across the Strait of Mackinac to the west of Mackinac Island. Marquette's influence on the Indians was deep and lasting.

MARQUETTE
Illustration is from a statue in Washington, D. C.

Consult Thwaites' *Father Marquette;* Finley's *French in the Heart of America.*

Related Subjects. The reader is referred to the following articles in these volumes:

Hennepin, Louis
Illinois (Indians)
Jesuits
Joliet, Louis
La Salle, Sieur de

MARQUETTE, Mich., the county seat of Marquette County, and a shipping point for an important mining region, centrally located on the north shore of the Upper Peninsula, 372 miles by rail, 500 miles by water, north of Chicago. The city is situated on Iron Bay, an inlet of Lake Superior, and has a good harbor protected by two breakwaters, constructed by the Federal government at a cost of $2,000,000. A number of boats sail regularly between this and other lake ports, and the Duluth, South Shore & Atlantic and the Munising, Marquette & Southeastern railroads enter the city. The population in 1910 was 11,503; in 1916 it was 12,409 (Federal estimate). Swedish, Germans and Finnish predominate among those of foreign descent. The area of the city is ten square miles.

Marquette is a favorite summer resort, and is noted for beautiful scenery and excellent climate. It is the seat of the Northern State Normal School, and has a Federal building erected in 1893 at a cost of $100,000, a city hall, a courthouse, the Peter White Public Library, three cathedrals, Saint Mary and Saint Luke hospitals, Roman Catholic orphanage, the State House of Correction and the upper peninsula branch of the state prison. One of the city's most attractive features is Presque Isle Park, a wooded section on a headland which was the gift of the Federal government.

Marquette has some of the largest ore docks in the world, and is the shipping port for the rich Marquette iron range. Coal is brought to the city as ballast in the returning ore boats. Among the most valuable resources of the locality are great tracts of pine timber and quarries yielding trap-rock, a very hard paving stone. The industrial establishments include blast furnaces, chemical works, iron works, foundries, machine shops, lumber and woodworking mills, and a wood-alcohol plant. Marquette was settled in 1845 and named in honor of Father Marquette. The commission form of government was adopted in 1914.

MARQUIS, *mahr'kwis,* a degree of nobility in the British peerage. Only a duke, among the peers, ranks higher than a marquis, an earl and baron holding lower rank. The name, which comes from the Latin through the French, is related to the term *mark,* signifying a frontier or outlying district; and the first marquis, on the Continent, though not in England, was the prefect of a frontier region. The title has now lost all such geographic significance.

MARRIAGE, *mair'ij,* the term which defines the social and legal relation of a man and woman who are joined in wedlock; the word also names the ceremony that joins them. The marriage relation is peculiar in that while two parties may by mutual agreement enter into it, once having done so the rights, duties and obligations are supposed to be continued uninterruptedly during the lives of the two.

Who May Marry. In the United States there are no uniform marriage laws, but the degree of relation within which parties may not marry is clearly defined by civil and canonical law. In England the table of consanguinity (blood relationship) has been drawn up by the Established Church and is printed in every prayer book for use in the services of the church. It is a disputed point, however, as to whether this generally accepted table of consanguinity is in reality legal or only obeyed because it has become customary. Apart from prevention through consanguinity, some state laws allow females of twelve and males of fourteen to marry, other states denying the right of marriage to females below the age of eighteen

and males below twenty-one. The legal age limit is generally established according to the old Roman law, under which females of twelve and males of fourteen reach marriageable age, but custom has entirely abolished such early marriages. The statutes of England and Canada still retain this decision, and deviation from this rule is the result of public opinion demanding a more mature age, rather than legal measures. It is now understood, if not actually demanded by the law, that in Great Britain and its dominions the parties to a marriage, unless with full consent of the parents, must have reached in the woman's case eighteen years and in the man's, twenty-one years.

In the United States the tendency is to raise the average marriage age, which is now sixteen years for women and eighteen for men, and to insist on the consent of parents or guardians if both contracting parties are not of legal age. In Wisconsin in 1913 a law was passed and declared constitutional, which requires medical proof of the soundness of health of both parties to the marriage. This statute aroused world-wide discussion, for it was a radical measure indicating an entire change of public opinion as to the rights of a state to take legal measures to promote healthful citizenship (see Eugenics).

History of Marriage. In primitive times, women were the common property of the horde or tribe, and there was no attempt at division by families. Children were known as the sons and daughters of certain women, but knew no fathers. When men came to abandon the nomadic life (see Nomad Life), settled in communities and divided the land so that each man had his own property, they began to select their women and made them a part of their personal effects. In those days possession, however obtained, was the only form of marriage, the woman having no status except as a slave. Every man claimed the woman he captured in war; all women became wives and slaves. The captured wife was not highly prized; as long as there were tribes to fight and conquer wives were plentiful. When there was no war of conquest to supply them, the custom of the purchase of wives was introduced; this tended to make wives more valuable. Among savage nations the custom of wife capture remained in practice for centuries, and among so-called civilized nations it was countenanced. So deeply rooted was the custom of wife capture that long after it had given place to wife purchase it was usual for a man to go through the form of capturing his wife, with the consent of her parents. The early history of Greece, Rome and Northern Europe shows that before the Christian Era wife purchase had been introduced, though wife capture had by no means completely died out.

In England and Canada at the present day a marriage ceremony performed by a duly ordained clergyman of the Episcopal Church is legal and binding, but in England a marriage ceremony performed by a nonconformist minister is not recognized unless validated by the presence of a registrar of civil marriages. If it is the intention of the contracting parties to be married in church, English law demands that due notice must be given by publication in the church of the "banns," or announcement of the names and residences of the two parties on three consecutive Sundays previous to the marriage, except where a license has been received from the duly appointed authorities to dispense with such announcement. See Banns of Marriage.

It has been held in international law that the captain of a ship may legally marry two persons desirous of entering into a matrimonial contract, provided there is no immediate possibility of obtaining the services of a duly-ordained clergyman or justice of the peace, and that the particulars of the wedding be entered in the ship's log book. Under English law a warrant from the secretary of state is necessary before a captain may act as a marriage officer. The law relating to marriage in Scotland differs from that of the rest of Great Britain. The statement by one of two persons, man or woman, in the presence of witnesses, that the other is his or her wife or husband, as the case may be, may be held to constitute a legal marriage.

Civil Law. The Canadian marriage laws are in harmony with those of England, but each province of the Dominion has its own special legislation on the subject. Barrie makes interesting use of this fact in his *Little Minister*.

Illinois, New Hampshire, Ohio, Indiana, Kansas, Arkansas, Nevada, Washington, North and South Dakota, Montana, Louisiana, Oregon, Pennsylvania, Michigan, Nebraska, Utah and Wisconsin prohibit the marriage of first cousins by blood, while New Jersey prohibits the marriage of any person who has been confined in any public asylum as an epileptic, or feeble-minded patient, without a certificate of recovery signed by two physicians, also stating that there can be no danger of transmission.

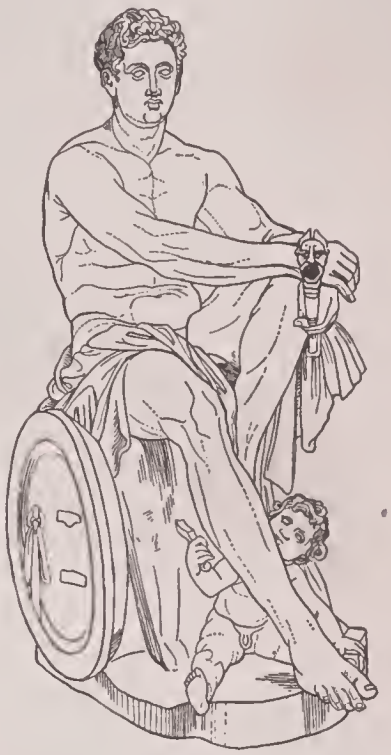
Morganatic Marriage. This is a marriage contracted by some member of a reigning house or, in certain countries, by one of the higher nobility, with a woman who is not his equal in rank. It is thoroughly legal, but may not exist side by side with another marriage; the children of such a union may not inherit their father's rank or his entailed estates.

Consult Howard's *The Family and Marriage;* Schuster's *The Wife in Ancient and Modern Times.*

MARRYAT, *mair'i at,* FREDERICK (1792-1848), an English sailor and author of energetic sea stories that have delighted the boys of two generations. After running away from home repeatedly with the intention of going to sea, he was sent out by his father on the frigate *Imperieuse* when the lad was fourteen. He took part in some fifty engagements against the French, his ship being part of the squadron of the Catalonians. He saved a great many lives during his service in the navy and was given a gold medal by the Royal Humane Society. The hardships which he endured as a seaman undermined his health, and at the age of forty he retired from naval service and devoted himself to story-writing.

His characters and incidents are taken from his own actual experiences, and one of his old shipmates used to say that to "read *Midshipman Easy* or *Jacob Faithful* was like spending a half day in the Captain's company in his best mood." He has vividly portrayed his commander, Lord Cochrane, in the characters of Captain Savage in *Peter Simple* and Captain M— in *The King's Own.* His stories are unpolished, and his thirty-five or forty volumes manifest very little literary art, but with all their faults they seem more like actual experiences than fiction. Among his best-known books, other than the above, are *Adventures of a Naval Officer, Newton Forster, The Pacha of Many Tales, The Pirate and Three Cutters, Japhet in Search of a Father, Peter Simple, The Phantom Ship* and *Frank Mildmay.* After a visit to the United States in 1837 he published a *Diary in America.*

MARS, *mahrz,* in mythology, was the god of war and one of the greatest of the gods in ancient Roman worship. His sacred emblems were the shield and spear, which the ancients believed had fallen from heaven. These symbols were kept on the altar of the temple devoted to his worship in the Campus Martius in Rome. In legend Mars was the son of Jupiter and father, by Rhea, of Romulus and Remus, the mythical founders of Rome. Because of his strength the Romans regarded Mars as a god who could accomplish all things. They prayed to him for rain, consulted him on all affairs and offered many sacrifices in his honor. When soldiers went to war they carried chickens sacred to Mars, and corn was given these birds just before a battle. If the food was greedily eaten it signified that Mars was on their side, but if eaten sparingly the battle would turn against them.



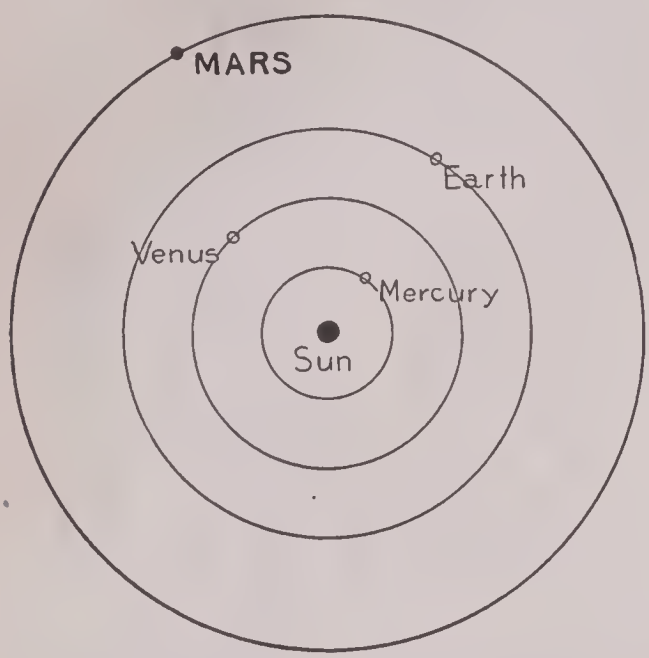
MARS
From a statue in the Vatican, Rome.

The chief festivals of Mars were in March and October; March was named for the god. The Grecian conception of Mars differs radically from the Roman. The Greeks gave the god the name of *Ares,* and worshiped him as the protector of fields and harvests.

MARS, one of the planets that has been known from very earliest times. It is more like the Earth than any other planet, and more than any other is the subject of study and speculation. The question as to whether Mars is inhabited is almost world old, yet whenever revived is always greeted with interest. Stories, books and plays have been written about inhabitants of Mars; the other planets even in imagination have not been peopled, but human imagination has for many years been determined to people Mars.

Mars is a fiery-red planet that moves with great rapidity among the stars, strongly attracting notice. It derives its name from Mars, the mythological god of war, and is the most aggressive, sturdy and vigorous of the planets. It is 141,500,000 miles from the sun, and its orbit is so eccentric that its radius varies more than 26,000,000 miles. At aphelion (the point most distant from the sun) the planet is 61,000,000 miles from the earth; at conjunction it is 234,000,000 miles distant. At its nearest approach, therefore, it is 148 times as far away as the moon.

Motions of Mars. Mars rotates on its own axis in 24 hours, 37 minutes, 22 seconds; it requires one year, ten and a half months (687 days), as we count time, to complete its journey round the sun. The seasons are similar to



MARS
Orbit of Mars and of the other three "inner planets" (between Mars and the sun).

our own, but are twice as long. The synodic period, that is, the time taken in traveling from conjunction to conjunction, of Mars, is the longest in the planetary system, being 780 days, during 710 of which the planet progresses towards the east, and during the other 70 it retrogrades.

Comparative Size of Mars. The diameter of Mars is 4,200 miles, about one-half that of the earth. Its surface is about two-sevenths, its volume one-seventh, of that of the earth. Its mass is less than one-ninth that of the earth, and its gravity is about one-third of the gravity of the earth's surface; a man weighing 150 pounds on earth would weigh only about 50 pounds in Mars. The atmosphere of Mars is probably much less dense than that of the earth, but there are indications that an atmosphere exists. The disk of Mars is brightest at the edges, or *limb*. It has been estimated that the *albedo,* or light-reflecting power of its surface, is double that of Mercury, but only half that of Jupiter.

Satellites of Mars. In 1877 two satellites were discovered by Professor Hall of the Naval Observatory, Washington, D. C. They are not visible to any except the most powerful telescopes, for they are among the smallest of known heavenly bodies. The outer one, farthest from the planet and called Deimos, is 14,600 miles distant from the center of the planet and completes its revolution in 30 hours, 18 minutes. The inner one, Phobos, is only 5,800 miles distant, its period being 7 hours, 39 minutes. Measurement of the diameter of such small and distant objects is difficult, but Professor Pickering estimated the diameter of Deimos at 7 miles, and of Phobus at 5 or 6 miles.

Canals of Mars. In 1877 the Italian astronomer, Schiaparelli, discovered features on the surface of Mars which have given rise to almost endless discussion. Five straight lines, ditches, or canals, as they are now called, cross the ruddy surface of the planet in various directions. So like canals do they seem that some astronomers have maintained that they are artificial, and that they are probably used as irrigation ditches. It is also noticed that these lines do not change their position, though sometimes they appear to be double.

Temperature of the Planet. The surface of Mars appears to be marked with indistinct gray patches, which were at one time assumed to be water; however, as the temperature on Mars is considerably lower than at the summits of our highest mountains—below zero, in fact—water could not exist. This has led astronomers to conclude that what appear to be polar ice caps, white patches at both poles which increase or dwindle according to the seasons, cannot be ice, but are formed of condensed gases.

While the differences between Mars and the earth are less than those between any other two planets, it is considered by many scientists that if Mars is inhabited it must be by some beings quite different from the people of earth, but the weight of evidence is against the theory. Others, however, argue that there are "other worlds than ours," and that Mars is one of them. Neither statement can be definitely proved, and Mars will probably continue through the ages a matter of speculation and interest. F.ST.A.

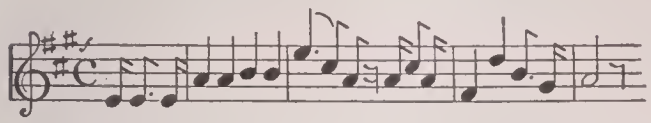
Consult Housden's *The Riddle of Mars, the Planet;* Lowell's *Mars as the Abode of Life.*

Related Subjects. The reader is referred to the following articles in these volumes:

Astronomy
Conjugation
Mars (war god)
Planet
Star

MARSEILLAISE, *mahr sel ayz',* in French, *mahr seh yaiz',* THE, the national hymn of France, written by a young officer named Rouget de Lisle, who composed both the words and the music in a single night during the French

Revolution. When a company of 600 volunteers were leaving Strassburg to join the army in April, 1792, the mayor of the city, who had planned a banquet in their honor, asked De Lisle to compose a song for the occasion. Its



FIRST STRAINS OF THE MARSEILLAISE
The words to the above music, translated, are:
"Ye sons of France, awake to glory!
Hark! hark! What myriads bid you rise!"

stirring music aroused such enthusiasm that 400 more joined the company before it marched off to war. One general said that it was worth as much in his army as the addition of a thousand men.

Although the song became very popular among the soldiers, it was not heard in Paris until the Marseilles battalion sang it as they marched towards the city to storm the Tuileries. From that time it was called the *Hymne des Marseillais,* or the *Marseillaise.* Louis XVIII gave the composer a pension on account of the song, while in the town of Choisy-le-Roi, where he died in 1836, there stands a monument erected to his memory. In July, 1915, at the height of French enthusiasm inspired by the War of the Nations, his body was removed from its temporary resting place in that town and taken to Paris, accompanied by a great procession and military parade. The song was suppressed by Napoleon, but in 1876 was adopted as the national hymn. The thrilling chorus is—

To arms, to arms, ye brave!
Th' avenging sword unsheathe!
March on, march on, all hearts resolved
On victory or death!

MARSEILLES, *mahr saylz',* the principal commercial port of France, if not of the entire Mediterranean Sea, second only to Paris in population among the cities of the republic. It is the chief town of the department of Bouches-du-Rhone, situated twenty-seven miles east of the mouth of the Rhone. The city is built in the form of an amphitheater, around a natural harbor of moderate size, known as the Old Harbor; a newer harbor, built about 1850, has a water area of 414 acres and a depth sufficient to accommodate the largest ocean vessels. Under normal conditions about 4,500 ships enter and clear the harbor each year. Despite its antiquity, Marseilles has no ancient monuments, but its population and commercial importance have rapidly increased. To-day it is a great, bustling city, as modern as any other metropolis.

Marseilles is a flourishing manufacturing center, working up the raw materials brought in by sea from all parts of the world. The principal manufactures include soap, steam engines and automobiles, oil, candles, macaroni, tiles and brick, and there are in addition sugar and petroleum refineries, lead, tin and copper plants, tanneries and flour mills. The city's memorable buildings include the Byzantine basilica, which serves as a cathedral; the pilgrimage church, Notre Dame de la Garde, with an image of the Virgin greatly venerated by sailors and fishermen; the museum of antiquities; and the Longchamp Palace, the latter a magnificent example of Renaissance architecture. The public institutions embrace a botanical and a zoölogical garden, a marine and astronomical observatory, libraries and schools of music, fine arts and medicine.

The first colony on the site of the city was founded by Phoenicians. Later, in 600 B.C., a party of Greeks from Asia Minor made a settlement there which they called Massilia. It was taken by Caesar in 49 B.C., and on the decline of the Roman empire became a prey to the Goths, Burgundians and Franks. During the tenth century it came under the dominion of the Counts of Provence, and for some centuries after it followed the fortunes of that house. During the French Revolution it was the scene of many stirring events, and it has given its name to that inspiring hymn of the Revolutionary era—*The Marseillaise* (which see). Population, 1911, 550,600.

MARSHAL, *mahr'shal,* a title of certain military and civil officers used in most civilized countries. The word, meaning *commander of the army,* was employed in England as early as the twelfth century. Marshals, or masters of horse, were appointed by early Frankish kings, and *marichal de France* eventually became the highest title in the French army; it was last borne by Joffre, the French hero of the War of the Nations. Camp marshals, from which the modern title *field-marshal* is derived, were introduced into the British army by George II in 1737; these had certain duties to perform, such as selecting camps and, with assistants, preserving order. The provost-marshal is still the highest military police officer. At the German court the *court-marshal* is an official of position and dignity, equivalent to the English lord chamberlain.

The United States marshal is an officer of the Federal courts, his duties being to open and close the sessions of the district and circuit courts, and to serve the processes of the courts of his district. Deputy United States marshals make arrests for violation of Federal laws. There are United States marshals in each Federal judicial district of the Union, which means there may be more than one in each state, and this statement also includes Alaska, Hawaii, Porto Rico and the Philippines. They are appointed by the President, with consent of the Senate, for a period of four years.

Temporary police sworn in for special occasions are also called marshals, and in villages and small towns the chief police officer also receives this title.

MARSHALL, JOHN (1755-1835), is the most famous of the jurists who have served as Chief Justice of the United States Supreme Court, and his term of thirty-four years is the longest thus far in the history of the nation's highest tribunal. When John Jay, the first Chief Justice, resigned in 1795, he declared that the Supreme Court would never possess dignity and power because of the character of its organization. Chief Justice Marshall, by adopting new methods of procedure, gave the court the authority he believed it was intended it should exert, and by his masterly analysis of constitutional questions set a precedent for the interpretation of nearly every point of the Constitution as it existed before the War of Secession.

JOHN MARSHALL

Because of the far-reaching importance of his decisions during thirty-four years as Chief Justice of the United States Supreme Court he has been called the "second maker of the Constitution."

John Marshall was born on September 24, 1755, at Germantown, Va. On the outbreak of the Revolutionary War he gave up, for the time being, the law studies which were occupying his attention and became a volunteer in the patriot army. By 1777 he had risen to the rank of captain, and when, in 1781, he resigned his command, he had suffered at Valley Forge during the terrible winter of 1777-1778, and had taken an honored part in the battles of Brandywine, Germantown and Monmouth, and in the storming of Stony Point. During the greater part of the year 1780 he attended a course of lectures in law at William and Mary College, and the following year was admitted to the bar.

Between 1782 and 1787 Marshall was several times elected to the state legislature of Virginia, and in 1788 he was chosen a delegate to the state convention which adopted the Federal Constitution. In that assembly he and James Madison led the debate in favor of ratification. During the next few years his reputation as a lawyer constantly widened, and he was asked by President Washington to accept the position of Attorney-General of the United States. He declined this honor, but consented to go to Paris in 1797 with C. C. Pinckney and Elbridge Gerry to settle various questions arising from restrictions on American commerce. On his return to the United States he was elected to Congress, and in 1800 held for a brief period the office of Secretary of State in the Cabinet of President John Adams.

On January 31, 1801, Marshall began his epoch-making career as Chief Justice of the Supreme Court. Of the cases which came before the tribunal, and on which he rendered decisions, four in particular deserve mention. The first case involved the right of the Supreme Court to take cases on appeal from state courts; Marshall's decision settled for all time the supremacy of the national tribunal. A second decision established the principle that the power of state courts and legislatures cannot extend to institutions established by the national government when acting under powers granted by the Federal Constitution. The case in point was the result of a dispute between the Bank of the United States and the state of Maryland, the former having refused to pay a tax imposed by the state government. For the details of the most celebrated case which came before the Supreme Court during Marshall's term of office, see DARTMOUTH COLLEGE, subhead *Dartmouth College Case.* M.R.F.

Consult Magruder's *John Marshall;* Flanders' *Life of John Marshall.*

MARSHALL, THOMAS RILEY (1854-), an American lawyer, governor and Vice-President of the United States, in the administrations of President Woodrow Wilson. He was born at North Manchester, Ind., and attended Wabash College at Crawfordsville of the same state, from which he was graduated in 1873. Later he received degrees from Notre Dame and the University of Pennsylvania. At the age of

twenty-one he was admitted to the bar and began the practice of law in Columbia City, Ind. In 1909 the people of Indiana elected him governor of the state; in 1912 and again in 1916 he was elected Vice-President of the United States. As a lawyer he was known for his persuasive eloquence, and as a governor for his executive ability and qualities of leadership. It was his progressive and efficient administration while governor of Indiana that brought him into national prominence and led to his nomination as Vice-President.

THOMAS RILEY MARSHALL

The fifth man who succeeded himself as Vice-President. The others were John Adams, Clinton, Tompkins and Calhoun.

MARSHALL, Tex., the county seat of Harrison County, situated in the northeastern corner of the state, near the eastern border line. Shreveport, La., is forty miles east, and Texarkana is sixty-seven miles north. Transportation is provided by the Texas Pacific and the Marshall & East Texas railroads. The city was founded in 1840, was incorporated in 1843 and was chartered as a city in 1848. Since 1909 the government has been administered on the commission plan. In 1910 the population was 11,452; in 1916 it was 13,712 (Federal estimate). The area of the city is nine square miles.

Formerly cotton was the chief product of this section of the state, but within recent years much attention has been paid to truck-farming and to the growing of fruit, especially peaches; the city is the market for these products and for the abundant yield of the pine and oak forests of the vicinity. Stock raising is also a source of revenue for the city. The largest industrial plants are the car and machine shops of the railroads serving the city; in these about 900 men are employed. Various other establishments include a large cotton compress, a cottonseed-oil mill and a pottery plant. Marshall has a fine courthouse and a city hall, and owns and operates its waterworks. Besides the public schools it has Wiley University (Methodist Episcopal), Bishop College (Baptist) for colored students, and a Carnegie Library.

MARSHALLTOWN, Iowa, the county seat of Marshall County and a shipping point of importance in its territory. It is situated a little northeast of the geographical center of the state, one-half mile south of the Iowa River, fifty-nine miles west of Cedar Rapids and sixty miles northeast of Des Moines. The Minneapolis & Saint Louis, the Chicago & North Western and the Chicago & Great Western railways serve the city. Marshalltown was settled in 1851, was incorporated as a town in 1865 and received its charter as a city of the second class in 1868. It was named in honor of John Marshall, former Chief Justice of the United States. In 1911 the commission form of government was adopted. According to the Federal census the population, almost entirely American, increased from 13,374 in 1910 to 14,360 (estimate) in 1916; the state census of 1915 reported 16,065. The area is seven square miles.

Marshalltown is located in a rich agricultural and stock-raising section, and it ships large quantities of wheat and other grain; hogs and cattle are raised in the district and the city has extensive meat-packing establishments. There are also flour mills, grain elevators, canning and bottling works, carriage factories and a large glucose factory. About 1,400 people are engaged in over sixty industrial plants, which have an annual output of over $3,500,000. The machine shops of the Minneapolis & Saint Louis Railway are located here. Notable buildings are an $85,000 Federal building, erected in 1908, a $100,000 Y. M. C. A. building, a $110,000 Masonic Temple, a fine courthouse and the buildings of the Iowa Soldiers' Home, which cover about 160 acres. Besides its public school system, the city has Saint Mary's Institute and a Carnegie Library. Riverview Park (fifty acres) provides recreation for the people.

MARSH HAWK, or **HAR'RIER,** a migratory hawk of the north temperate zone. The male is nearly two feet in length, with dull blue-gray feathers; the females and the young are dark brown. The marsh hawk derives its name from its habit of haunting wet meadows and marshes, and of building its nest on swampy ground; it is sometimes called *harrier* because of its persistence in hunting its food. It is a long-winged bird, and capable of high, rapid flight, but usually skims along a few feet above a meadow watching for its prey—mice and frogs—which it can distinguish even in the twilight. The nest, a foot or more in diameter, contains four to six bluish-white eggs. See Hawk.

MARS, *mahrz,* **HILL,** a rocky hill in ancient Athens, lying west of the Acropolis. On the

hill were held the meetings of the oldest justice court of the Athenians—the Areopagus (which see). Here, too, Paul preached the sermon recorded in *Acts* XVII. Authorities have never satisfactorily accounted for the name Mars Hill (or Hill of Ares), for the worship of the god of war was not connected with the hill.

MARSH MAL'LOW, a coarse herb of the mallow family, found growing in meadows and marshes in the north temperate zone. The stalks are woody and grow from two to three feet high; the leaves are large and broadly oval; both stalk and leaves are covered with a soft, downy hair. The pale pink flowers sometimes grow in the crotch between leaf and stem, but oftener in a cluster topping the stalk. It has a white, carrotlike root, which in times of famine has been used for food. This root yields glue and *demulcent,* or soothing medicine, but its most common use is as a basis for the candy also called marshmallow.

THE MARSH MALLOW

MARSTON MOOR, *mahrs'ton moor,* a plain in Yorkshire, England, about seven miles west of York, where the armies of King Charles I, under the leadership of Prince Rupert, were routed by Cromwell and Fairfax, July 2, 1644. This victory gave to Cromwell and the Parliamentary party the whole north of England, practically breaking the king's power. See CROMWELL, OLIVER, and other references there noted.

MARSUPIALS, *mahr su'pi alz* (from a Latin word meaning a *pouch* or *bag*), an order of mammals — *marsupialia* — remarkable for the fact that the females carry the young in an external pouch for some time after they are born. At one time animals of this order were found almost everywhere, but now they are limited almost entirely to America and Australia. The opossum is the only American representative. The kangaroo, wombat, bandicoot and Tasmanian wolf are Australian members of this group.

Although generally like other mammals, marsupials differ in the striking peculiarity which gives them their name. The young are born in an undeveloped state. The mother immediately places them in a pouch which is usually under the abdomen, and there they are cared for until fully developed. For some time after they are able to provide for themselves, however, they return to the mother's pouch for refuge when frightened. Some marsupial animals live in trees, others on the ground and a few in water. Some are meat-eaters, while others live only on vegetable food; some eat insects only, and others live on every kind of food they can obtain.

Consult Parker and Haswell's *Textbook of Zoölogy;* Scott's *History of Land Mammals in the Western Hemisphere.*

Related Subjects. The student who wishes to make a somewhat extended and systematic study of this curious order of animals is referred to the following articles:

Bandicoot	Opossum
Kangaroo	Tasmanian Wolf
Koala	Wombat

MARTEN, *mahr'ten,* a fur-bearing animal belonging to the same family as the sable; it inhabits the northern parts of both the Eastern and Western hemispheres. The best-known American species, called *American sable* and

THE PINE MARTEN

pine marten, once roamed through the forests from Labrador to New Jersey, but it retreated into the wilds as civilization advanced; it is still found in large numbers in the dense woods of the Hudson Bay region. It is this species that for over two centuries has supplied the most valuable fur for the American trade. From November to March its rich brown coat is thick and soft, though sprinkled with coarse black hairs, which are pulled out by the furrier. During this season the marten hunter is busiest, about 100,000 of the animals being killed each year to supply the demand. The fur is made into coats, caps, muffs and boas, and commands about the same price as mink.

Choice marten muffs sell for $65 and upward. This fur, however, is much less expensive than sable (which see). Skunk fur is often treated and sold as marten.

The species mentioned above makes its home in crevices of rocks or in tall trees, frequently appropriating for its use large woodpecker or squirrel holes. In summer it moves to low, swampy places. It is about twenty-four inches long, including the bushy tail, which is from seven to eight inches in length. Rabbits, squirrels, partridges and other birds, mice and nuts constitute its fare, and it has little to fear from forest enemies, the strong flavor of its flesh being distasteful to most flesh-eating animals.

Another American species, which is three feet in length, and the largest of the group, is called *pekan* by French-Canadian trappers, and *fisher* marten by hunters from across the border. Well-known European species are the *beech* or *stone marten,* which has a white throat and chest, and the *sweet* or *pine marten* (now rare), whose fur on throat and chest is yellowish. See FUR AND FUR TRADE.

Consult Seton's *Life Histories of Northern Animals;* Coues' *Fur-Bearing Animals.*

MARTHAS VINEYARD, *vin'yard,* an island off the south coast of Massachusetts, separated from the mainland by Vineyard Sound, which has a width of from four to six miles. The island forms the greater part of Dukes County, Mass., and is twenty miles long and ten miles in greatest width. It is low and mostly covered with forest, is a popular summer resort and has been particularly noted for its large camp meetings. The county seat is Edgartown, the other principal towns being Fisbury, Gay Head, Chilmark and Cottage City; the permanent population is about 5,000. The island was discovered in 1602 by Bartholomew Gosnold.

MARTIAL, *mahr'shal* (Marcus Valerius Martialis) (about 40 - about 102), a famous Roman epigram writer, born at Bilbilis, in Spain. In 64 he went to Rome, and remained there under the favor of the emperors, especially Domitian, until the year 98, when he returned to his native city. Martial's fame rests on fourteen books of epigrams, which describe with the keenest wit the customs and vices of the society of his day.

MARTIAL LAW, or **MILITARY LAW.** *Martial* is derived from the Latin *martialis,* which pertains to Mars, the mythological god of war. Martial law is the extension of the rules of war to any community in which the civil authority is unable to maintain public order, and it is exercised by the military power of the state or nation. It is government by armed force—legally employed—against unlawful operations that threaten to destroy society. Strikes, riots and the like may involve a locality in such strife that the safety of the people is endangered.

In a city, under such circumstances, the mayor would doubtless first call upon the county sheriff to aid his police force; if both proved ineffective, the governor of the state or province would be requested to send a sufficient force of militia to control the situation. Upon its arrival at the scene of trouble the military entirely succeeds the civil authority in all matters that conflict with it, but in other respects the civil control remains supreme; in his work of pacification the commander of the troops holds autocratic power over all citizens; for his actions in line of duty he cannot later be held to account, but for abuse of authority he and all connected with him may be treated as trespassers. In opposing unlawful acts and attempting to restore peace, it may be necessary to destroy property and even to sacrifice human life; the authorities are expected to apply the most rigorous measures to assure reëstablishment of order. The military arm of the government cannot succeed the local police power except by request of the latter; and military occupation must be withdrawn when local officials request it. The state bears the entire expense resulting from a call for troops to protect any community.

The executive authority of a state or country may call upon the nation's standing army to crush insurrection or repel invasion; the latter may declare martial law in the affected territory and apply the most stringent rules of war the occasion may require. The right to invoke martial law is recognized by every civilized country as being necessary to the preservation of law and order, but such action is never justified except in extreme instances, when local authority becomes admittedly helpless in the face of unlawful forces.

MAR'TIN, a name applied to several species of the swallow family. The *purple martin,* distinguished by the lustrous, purplish-blue color of the male, is widely distributed throughout North America. It is found as far north as the Saskatchewan valley, and winters in Central and South America. This bird builds its nest in a box, or attaches it to the eave of a house, and sometimes its home is in a decayed tree. It is grateful for any hospitality, will

return year after year to prove its gratitude, and is usually a welcome guest on account of its services in driving away hawks and crows. Its flight is swift, easy and graceful. The eggs, four to six in number, are white and glossy, and two broods are reared in the season; it feeds on wasps, bees and beetles, which are swallowed whole. Several pairs will dwell in harmony in the same nest. There are other species of martin; among these are the *house martin* and the *sand martin,* both of which are smaller and less conspicuous in color than the purple martin. See SWALLOW.

MARTINIQUE, *mahr ti neek',* a French island belonging to the Lesser Antilles of the West Indies and lying almost midway between the two British islands of Dominica and Saint Lucia. The former is twenty-five miles to the north; the latter, twenty miles to the south. Martinique is roughly oval in shape; it is forty miles long and about twelve miles wide, and has an area of 380 square miles. From its rocky surface rise numerous volcanic mountains, the loftiest of which is Mount Pelée (4,430 feet), in the northwest. This mountain has become famous through its appalling eruption of 1902, which destroyed Saint Pièrre, then the largest city on the island, and caused the death of over 30,000 persons. Over a third of the island is under cultivation, the principal crop being sugar cane; coffee, cocoa, tobacco and cotton are grown to a limited extent.

Martinique was discovered by Columbus, some authorities placing the date at 1493, and others at 1502. Later it came into the possession of the French, who began to colonize it in 1635. The island was the birthplace of the Empress Josephine, wife of Napoleon Bonaparte. At the present time it is a French colony, and represented in the French Parliament by one senator and two deputies. Fort de France, capital of the colony of Martinique, has a population of about 27,000. Population of the entire island, 1913, 185,400.

MAR'TINSBURG, W. VA., is the county seat of Berkeley County, in the extreme northeastern part of the state. It is seventy-eight miles northwest of Washington, D. C., and seven miles west of the Potomac River, and is on the Baltimore & Ohio and the Cumberland Valley railroads. The area is nearly three square miles. The population, which in 1910 was 10,698, was 12,666 in 1916 (Federal estimate).

The city is situated in the lower Shenandoah Valley, protected by the Blue Ridge Mountains. In this fertile section are grown fruits, especially apples and peaches, and grains and garden truck. Horses, cattle, sheep, hogs and poultry are raised for the markets. The working of immense limestone and shale deposits is a growing industry. There are manufactures of flour, woolens and worsteds, hosiery, lumber, lime and wagons; canning factories, automobile works, cement plants and railroad repair shops are the chief industrial enterprises.

Martinsburg was settled before the War of Independence; it contains a Federal building, county courthouse, Y. M. C. A. and a city hospital and nurses' training school. D.H.R.

MAR'TIN'S FERRY, OHIO, a city of Belmont County, almost directly across the Ohio River from Wheeling, W. Va. It has steamboat and barge lines, and is on the Wheeling & Lake Erie, the Baltimore & Ohio and the Pennsylvania railroads and electric interurban lines. The population, nearly one-fourth foreign, in 1910 was 9,133; in 1916 it was 9,996 (Federal estimate).

Martin's Ferry is attractively located and has a Federal building erected in 1916 at a cost of $85,000, a public library and a hospital. There are iron and coal mines and limestone quarries in the vicinity. The industries of the city are steel mills, tin mills, a blast furnace, glass factory, sheet-steel rolling mills, metalware manufacturing plants, box and barrel factories, novelty mold works and a stove foundry and heater works. One of these concerns, among the largest of galvanized ware plants in the United States, employs 7,500 men.

A settlement, called Martinsville, was incorporated as a village in 1865. The name was later changed to Martin's Ferry, and the place became a city in 1885. A.J.F.

MARTYR, *mahr'tir,* the name applied to early Christians who suffered great persecution and even death rather than renounce their faith and trust in Christ. The number of martyrs reached into the thousands during the many periods when upheavals in the Church completely destroyed religious toleration. Stephen is regarded as the first Christian martyr, for he was seized and stoned to death by his fellow citizens for denouncing their wicked deeds (*Acts* VII, 59-60). Festivals in honor of martyrs were given as early as the second century, for they were greatly venerated by fellow believers, who often offered prayers at their tombs and thanked God for the example which they had given the world. In the old Roman calendar there was a feast in honor of all the mar-

tyrs, which, in 731, was changed by Gregory III to include all saints.

MARX, *marks,* [HEINRICH] KARL (1818-1883), the founder of modern socialism, was born at Treves, Germany, of Jewish parentage. After completing his education at the universities of Bonn and Berlin, he became editor of a paper of liberal tendencies, published at Cologne. In 1843, shortly before this periodical was suppressed by the German government, he removed to Paris, where he came into close touch with a group of French socialists and assisted in editing one of their organs. The most potent influence in his life, however, was the friendship which he formed with Friedrich Engels, another German pioneer in socialism. Together they worked out a program known as the *Communist Manifesto,* which was issued in 1847 at a radical congress held in England. It advocated such revolutionary measures as a progressive income tax, abolition of inheritance rights, national control of railways and all means of communication, abolition of child labor in factories and free education in public schools.

Marx devoted the rest of his life to the work of spreading his socialistic views. This he did by means of his pen and through his genius for organization. In 1864 he realized the great ambition of his life when he united into one great league the laborers of the civilized world —the International Workingmen's Association. Five years later he helped to found in Germany the Social Democratic Labor party. The best exposition of his views on political economy is to be found in his *Das Kapital* (Capital). In this he asserts that all industries should be controlled by the state and not by individuals, a fundamental principle of socialism. See SOCIALISM.

Consult Aveling's *The Students' Marx;* Spargo's *Karl Marx, His Life and Work.*

MARY, the name of two queens famous in the history of England.

Mary I (1516-1558), queen of England and fourth sovereign of the Tudor line, is known as "Bloody Mary" because of the persecutions which she sanctioned in her determination to restore Roman Catholic worship to her realm. Over 300 persons were put to death, the most eminent of the martyrs being Cranmer, Ridley and Latimer. Mary, who was the daughter of Henry VIII and Catharine of Aragon, ascended the throne in 1553 on the death of Edward VI, after the unsuccessful attempt to set her aside in favor of Lady Jane Grey, "the nine-day queen." Her first measures were the repeal of all the religious statutes of Edward VI, and the revival of severe laws against heresy. Cardinal Pole was sent to England as the papal representative, and the kingdom formally restored to the Roman Church. She further displeased her subjects by her marriage to Philip II of Spain. Under his influence the queen waged a war with France resulting in the loss of Calais, which fell in 1558, after it had been in English hands over 200 years. This event was a source of deepest sorrow to the queen, who died shortly after.

MARY TUDOR

Mary II (1662-1694) was the eldest daughter of James II and Anna Hyde, the latter the daughter of the Earl of Clarendon. When she was fifteen years of age the Princess Mary became the wife of William, Prince of Orange, President of the Dutch Republic. When, by the "Glorious Revolution of 1688," James II was dethroned, the crown of England was accepted by William in accordance with his wife's claims to royal birth, and in response to an invitation from certain eminent nobles of the realm. In 1689 William and Mary were crowned joint sovereigns, with the understanding that the administration of affairs should be vested in the king. Mary, however, showed herself capable of acting with courage and good judgment when William was necessarily absent from England, and historians join in praising her for her unchanging loyalty to her husband. In her private life she was sincerely pious, modest and charitable. Five years after her accession she died of smallpox.

Consult Froude's *The Reign of Mary Tudor;* Rait's *Five Stuart Princesses.*

Related Subjects. The reader who desires further information as to the events of these reigns is referred to the following articles in these volumes:

Calais	James II
Catharine of Aragon	Latimer, Hugh
Cranmer, Thomas	Ridley, Nicholas
Grey, Lady Jane	William III
Henry VIII	

MARY, THE VIRGIN, the mother of Jesus, a daughter of a patrician family, who lived humbly and obscurely in Nazareth. In a stable at

Bethlehem, where she had gone to be enroled in the House of David, according to the mode of taking the census, she gave birth to the Saviour. Through the sufferings of her Son, her life had many sorrows, and from the Cross He commended her to the care of the beloved disciple John. Little of her life has been recorded, and tradition says she died at Jerusalem in A.D. 63. In Christian art Mary occupies a prominent place (see MADONNA AND HER BABE). She is a perfect type of Christian womanhood.

MARYLAND, a South Atlantic state, one of the original thirteen states of the American Union, named in honor of Henrietta Maria, wife of the English king, Charles I. Maryland is popularly known as the OLD LINE STATE, the greatest part of its northern boundary being Mason and Dixon's Line.

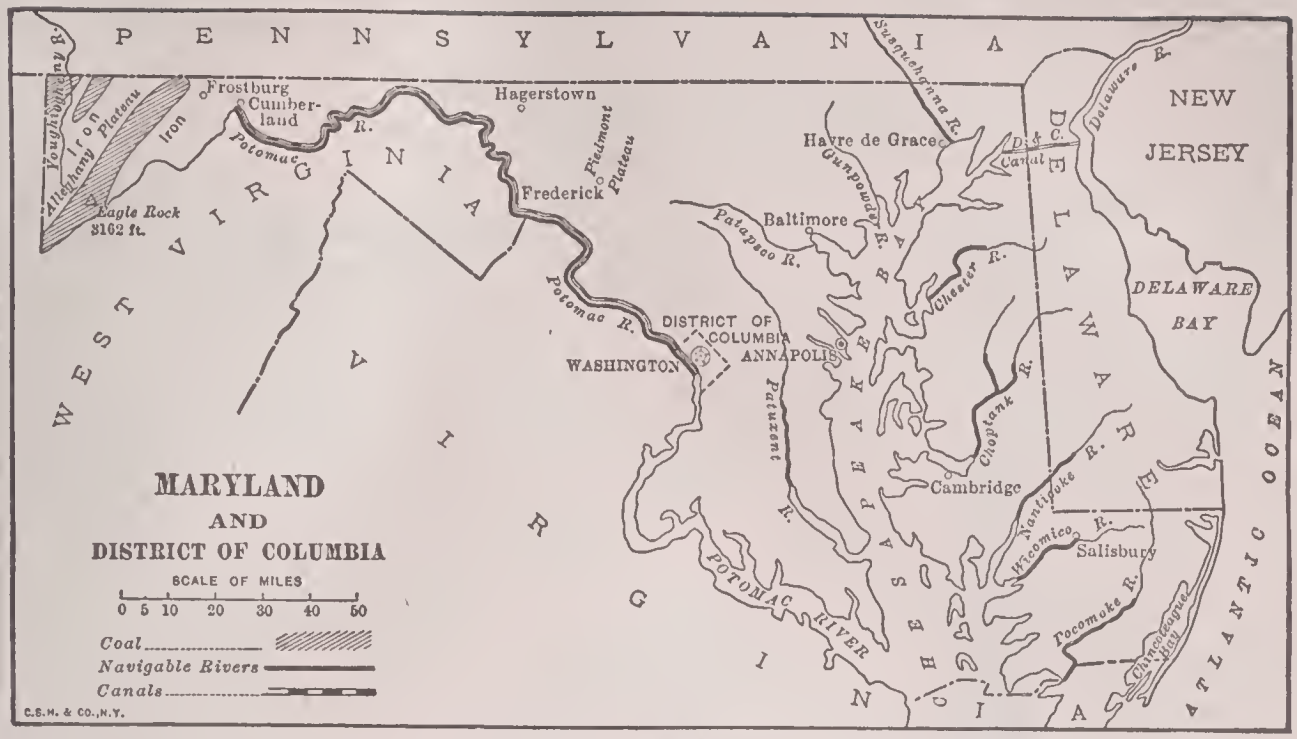
Size and Location. Maryland lies for the most part between Pennsylvania and Virginia. Ranking forty-first among the states in area, it is about half the size of West Virginia and lacks 3,300 square miles of being half as large as New Brunswick. The water surface is 2,386 square miles, or over one-sixth of the total area of 12,327 square miles. Maryland's extreme breadth from north to south is 128 miles, on the east shore of Chesapeake Bay, while at Hancock, in the western end of the state, its breadth is but two miles. It is in form one of the most irregular states of the Union.

The People. In the number of inhabitants Maryland ranks twenty-seventh among the states, but in the density of its population it is exceeded by only six states. As compared with the average density of 30.9 per square mile for the United States in 1910, the population of Maryland averaged 130.3 per square mile. Of the 1,295,346 inhabitants in 1910, 232,250, or about 5.5 per cent, were colored, and 191,838 were foreign-born whites, principally Germans and Russians. The estimated population January 1, 1917, was 1,368,240. About 250,000 are negroes. The colored population of Baltimore is exceeded in only four other cities of the United States, namely, Washington, New York, New Orleans and Philadelphia. The urban population in the six cities of 2,500 or more in 1910 was 658,192, and the rural population numbered 637,154, or 49.2 per cent. Over two-fifths of the entire population of the state live in Baltimore, which city, with its estimated population of 589,621 in 1916, ranked seventh in size among the cities of the United States. Other chief cities are Annapolis, the capital; Cumberland, Hagerstown, Frederick and Cambridge.

The Roman Catholic and Methodist churches have the largest number of adherents. Other prominent denominations are the Episcopalians, Lutherans, Baptists and Presbyterians.

Education. The present system of common schools was put into effect in 1865, since which time a marked development and improvement have been noted. The illiteracy decreased from 19.3 per cent in 1800 to 11.1 per cent in 1900 and 7.2 per cent in 1910. At the head of the school system is the state board of education, under the direction of the state superintendent, who is appointed by the governor for four years. County commissioners are appointed by the governor for six years. In 1912 a compulsory school law was passed, the enforcement of which is left to the boards of the counties, except in the five whose representatives have exempted their counties. In 1914 five counties were enforcing this law, with an increase of ten to fifteen per cent in school attendance. A law providing for the consolidation of schools and the establishment of a state university was enacted in 1914.

Besides normal schools at Baltimore, Frostburg and Bowie, institutions for higher learning receiving state aid are Johns Hopkins University at Baltimore; Western Maryland College at Westminster; Washington College at Chestertown; Saint John's College at Annapolis; Maryland Agricultural College at College



OUTLINE MAP

Showing boundaries, navigable rivers, principal cities, and the highest point of land in the state.

Park and Blue Ridge College at New Windsor. Other prominent institutions are Goucher and Hood colleges for women at Baltimore; Woman's College at Frederick; Maryland College for Women at Lutherville; Morgan College, a coeducational school for the colored at Baltimore, and Jacob Tome Institute, at Port Deposit. Conducted under the auspices of the Roman Catholic Church are Loyola College and Mount Saint Joseph College at Baltimore; Rock Hill College at Elliot City, and Mount Saint Mary's College at Emmetsburg. The United States naval training station is at Annapolis.

The Land. The diversified surface of the state may be divided into three distinct sections. These are the coastal plain, the Piedmont plateau and the Appalachian province.

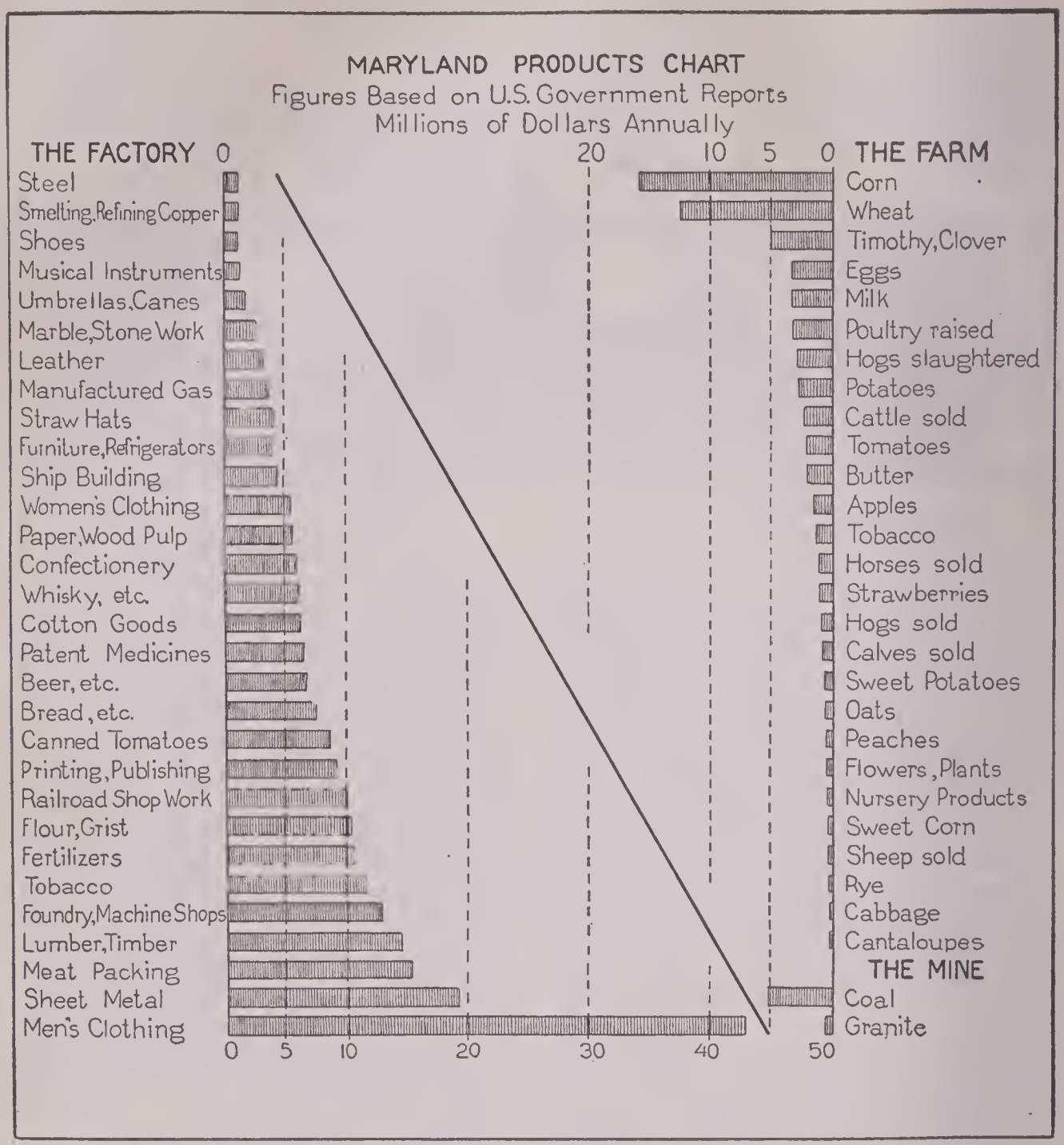
The *coastal plain,* or *Tidewater Maryland,* occupying more than half the state, is divided in half by Chesapeake Bay, two-thirds of which lies in the state of Maryland. The bay is from ten to forty miles wide and is navigable by the largest ships. Its many arms and estuaries afford numerous and excellent harbors. The east shore is low and level, in few places, except at the extreme north end, rising more than twenty-five feet. The west coast is higher, rising to an elevation of 300 feet at Baltimore. Along the Atlantic border there is a long, reef-like sand beach enclosing shallow lagoons called Chincoteague and Sinepuxent bays.

The rivers flowing into the Atlantic are insignificant; most of the state is drained by the broad-mouthed rivers emptying into Chesapeake Bay. The largest of these are the Nanticoke, Choptank and Chester, on the east shore, and the Potomac, Susquehanna, Patuxent, Patapsco and Gunpowder, on the west shore. The northeast corner of the state is drained into Christian Creek and the extreme northwest section, towards the Ohio River.

The Piedmont plateau, extending forty miles from the Atlantic plain to Catoctin Mountain, is broken and hilly. The highest points are at Parr's Ridge, in Carroll County, and Sugar Loaf Mountain, which rises abruptly to an elevation of 1,281 feet. Between Parr's Ridge and Catoctin Mountain lies the level, fertile Frederick Valley, drained by the Monocacy River into the Potomac.

The Appalachian region is a succession of valleys and parallel, wooded mountain ridges extending from northeast to southwest. The Blue Ridge range, which rises 2,400 feet near the Pennsylvania line, crosses the state east of the Hagerstown valley. This range, together with North Mountain, lying west of Hagerstown valley, and the Alleghany ridge, between North Mountain and Cumberland, are the chief mountain chains. The highest point in the state is Eagle Rock, 3,162 feet, situated in the northwestern corner of the state, near the West Virginia boundary.

Climate. Owing to the diversity of its surface, Maryland has many varieties of climate. In the western mountainous region the winters are cold and the summers short and cool. In

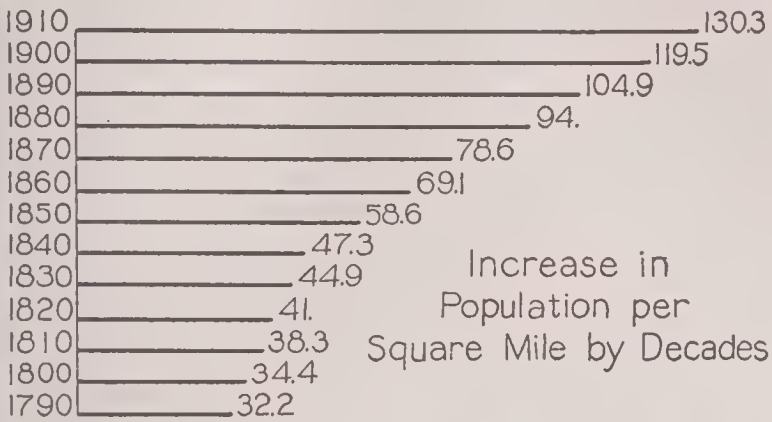


the south and east, the winters are mild and the summers hot. In these coastal sections, the growing season is a month longer than that of the mountainous region, which lasts only from April 15 to October 1. There are frequent changes and great daily ranges of temperature. In the north-central section, the temperature for July averages 75° F. and for January 30° F. The average annual temperature of the state is between 53° and 54°. On the western slope of the Alleghany plateau the rainfall is most abundant, averaging fifty-three inches per year. On the eastern slope of Parr's Ridge the average precipitation is forty-five inches. The valleys between Cumberland and Hagerstown have the least rainfall, the average amount being thirty to thirty-five inches, which is twelve inches less than that of the Atlantic plain.

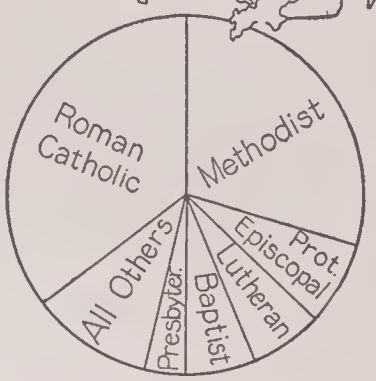
Agriculture. One of the most distinguishing features of Maryland is its great variety of soil. In the light, warm, moist soil of the eastern shore many southern plants not common to the latitude of Maryland can be grown. A light, sandy, loamy soil, adapted to truck farming and the growing of vegetables and small fruits, is found in most of the coastal plain. In the southern part of the state the soil contains more clay and is better adapted to the culture of tobacco, large quantities of which are grown and exported. In Hagerstown valley and the Piedmont plateau the soil is heavy and better suited to general agriculture

Congressional Districts

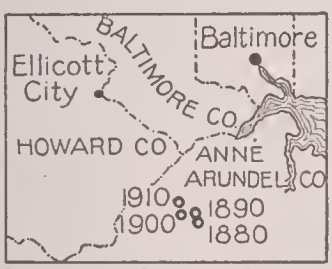
MARYLAND



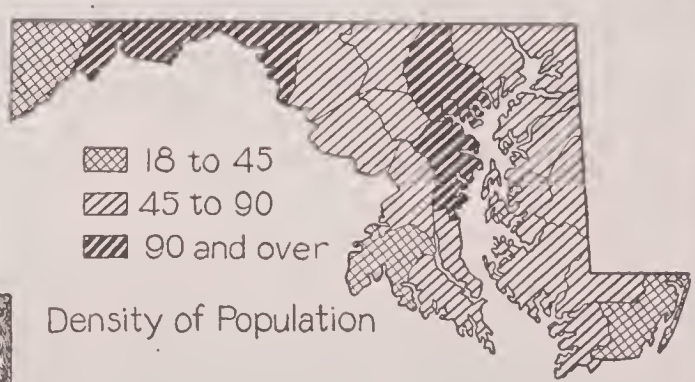
Increase in Population per Square Mile by Decades



Religions in the State

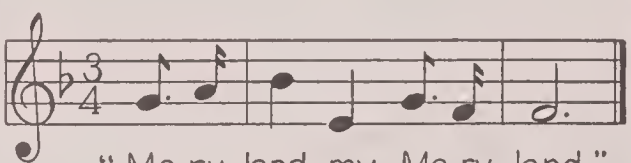


Center of Population



Density of Population

Old National Road and Tollhouse



"Ma ry-land, my Ma ry-land."

The Oyster Fleet in Chesapeake Bay

than that of the coastal plain. Corn, wheat, hay and forage are grown extensively in this section. On the west slope of the Blue Ridge Mountains, the soil is peculiarly adapted to the growing of peaches. The principal fruit crop of the state is the apple, Anne Arundel County being the best apple-producing section. The most important of the small fruits is the strawberry. For many years Maryland produced more strawberries than any other state, but has recently been surpassed by three states, New York, California and Missouri.

The farm lands in 1910, occupying eighty-two per cent of the total area of the state, totaled 5,057,140 acres, of which 4,504,693 acres were owned or worked by white farmers. The farms average 103.4 acres in size and $32.32 per acre in value. The cultivation of flowers and nursery products is important, and beekeeping is extensive. The total value of crops is about $50,000,000 a year, of which fifty per cent is in corn and wheat.

The live-stock section of the state is in the central plateau region, Hagerstown valley and the central section of the east shore. Dairy farming and poultry raising are important branches of this industry. The dairy product exceeds $5,000,000 in yearly value, and the income from poultry products is even larger.

Minerals. By far the most important mineral product of Maryland is coal, most of which is mined in Garrett County and in the Cumberland field and George's Creek, in Alleghany County. The coal is of two kinds, bituminous (soft) and semibituminous. Most of the product is of the latter variety, which is the best quality found in the United States for the generation of steam and for blacksmithing purposes. The coal deposits, discovered in the Forestburg area in 1804, were not extensively worked until 1842, when railroad transportation was secured. Since the War of Secession the output has steadily increased, and for a number of years the average production has been about 4,000,000 long tons annually. Maryland usually ranks fourteenth among the states in coal production. The methods of mining are not modern, and ninety-five per cent of the coal is still mined by hand.

Clay-working and stone-quarrying are next in importance. The value of the clay products of the state is about $2,000,000 a year. Maryland is one of the few states which produce slate used in roofing. White marble is found in Baltimore County. Granite, limestone, sand, gravel and lime are other important products. The value of the mineral output including mineral waters is about $11,000,000 annually.

Fisheries. In proportion to Maryland's population, fishing is a more extensive occupation than in any other state of the Union. The sheltered waters of Chesapeake Bay and its shallow estuaries yield more oysters than are produced in any other state. The oyster product is nearly 6,000,000 bushels a year, valued at about $2,750,000, which is nearly seventy-five per cent of the entire fisheries output of the state. In the rivers, shad, soft and hard crabs, striped bass, perch, sturgeon and terrapin are caught in large quantities. In recent years, the value of Maryland's fisheries has decreased, falling from $6,460,759 in 1870 to $3,405,900 in 1914. In the latter year there were 8,400 fishermen and 1,100 fishing vessels in the state.

Manufactures. Since the early settlement of Maryland, manufacturing has been an important industry. The chief industry is the manufacture of men's clothing, in the production of which Maryland ranks fourth among the states. In 1914, with an output of manufactured goods valued at almost $377,000,000, more than $280 per capita, Maryland ranked fourteenth among the manufacturing states. The canning and preserving of fruits, vegetables, fish and oysters are important; Maryland produces almost half of the canned tomatoes used in the United States. Baltimore, ranking thirteenth among the manufacturing cities of the United States, is the chief industrial center. Cumberland, Hagerstown and Frederick are next in importance.

Transportation. Maryland has ample traffic facilities, both by land and by sea. The chief railroads are the Baltimore & Ohio, one of the first railroads of the United States; the Philadelphia, Baltimore & Washington; the Western Maryland; the Chesapeake & Atlantic; the Northern Central and the West Virginia & Pittsburgh lines. In 1914 there were 1,401 miles of steam railroad and 945 miles of electric railway in Maryland. The Chesapeake & Ohio Canal, which in 1850 opened navigation on the Potomac from Georgetown to Cumberland, now is used chiefly for the transportation of coal.

Unusual facilities for water transportation are afforded by Chesapeake Bay and the wide, navigable rivers. Thirty-three steamship lines enter Baltimore, which is one of the best ports of the Atlantic and which in 1914 ranked second in the exportation of grain and first in the export of coal. The Chesapeake & Delaware

RESEARCH QUESTIONS ON MARYLAND

(An Outline suitable for Maryland will be found with the article "State.")

What is the dominating physical feature of that part of the state popularly known as "tidewater" Maryland?

How large a proportion of the area is in farm lands? How many farms of the average size for the state would this make?

In what important export does the chief port of this state rank first among the ports of the country?

What very important institution belonging to the Federal government is located in this state? Where is it?

In what agricultural product did Maryland long rank first? How does it now rank?

How does this state compare as regards railway mileage in proportion to area with Illinois? With Texas? With the country as a whole?

What is the "grandfather's clause," and what is its purpose? Why was not Maryland successful in its attempt to extend the scope of the law?

How is the compulsory school law enforced? What difference has the passing of that law made in school attendance?

Distinguish between the several varieties of soil in the different parts of the state, and tell what effect each has on agriculture.

Of what manufactured product does Maryland produce almost half of all that is used in the country?

Which are worth more, the entire crops of a year or the entire output of the manufacturing industries?

With what famous song is an event that happened on Maryland soil connected? Tell the story of the writing of this song.

What was the per cent of decrease in illiteracy during the nineteenth century?

How does it happen that the western part of the state, though removed from the influence of the ocean, has cooler summers than the eastern region?

Which are of greater value, the oyster fisheries of the state or all the other fisheries put together?

How many states had ratified the Federal Constitution before Maryland did so? How did this happen?

How does this state compare in density of population with New York? With Ontario? With the United States as a whole?

How high is the loftiest point in the state? How many states have a maximum altitude lower than this?

For whom was the chief city of Maryland named? What did he have to do with the history of the state?

What is Mason and Dixon's Line?

How many times as wide is Maryland at its widest point as at its narrowest? How many states are smaller?

What is the highest point in the Piedmont plateau region?

Why were not the coal deposits discovered in 1804 worked until nearly forty years later? For what is Maryland coal specially adapted?

For whom was this state named? Give its popular name and tell its origin.

What is a chief characteristic of the rivers that empty into Chesapeake Bay?

Which are more valuable, the dairy products or those of the poultry industry?

Ship Canal, connecting Chesapeake Bay and the Delaware River, which in 1917 was being reconstructed by the Federal government, will further increase the advantages of water transportation.

With the building of the Baltimore & Ohio Railroad, the construction of the first telegraph in the United States, and the Chesapeake and Ohio Canal, Maryland led in the movement for internal improvements in the early part of the nineteenth century. Since 1900 the state has been more active than ever before in the improvement of its highways.

Government. Maryland has had four constitutions, adopted in 1776, 1851, 1864 and 1867. The present constitution, to which there have been sixteen amendments, provides that amendments may be enacted by vote of three-fifths of the members of the state legislature and the majority of qualified voters. The constitution may be changed by a constitutional convention called every twenty years.

The legislative department consists of a senate of twenty-seven members, serving four years, and a house of delegates, consisting of 102 members elected every two years. An unusual provision made during the early religious difficulties between the Roman Catholics and Protestants of Maryland prevents clergymen of any denomination from serving as senators or delegates. The general assembly meets the first Wednesday of January on the even-numbered years. Sessions are limited to ninety days. Maryland sends six representatives to Congress.

The executive department consists of the governor and attorney-general, elected by the people for four years, and a treasurer chosen by the legislature for two years.

Towns or cities may adopt the commission form of government, but at the close of 1916 Cumberland was the only city that had adopted this form. Workmen's compensation laws and provisions regulating the employment of children have been passed.

The judiciary consists of a court of appeals, circuit courts, orphans' courts and justices of the peace. The judges are elected by the people for fifteen years, or until they attain the age of seventy, when they must retire. Chief judges from seven circuits and a judge elected from the city of Baltimore, the eighth circuit, constitute the court of appeals.

Local administration is by counties. State institutions are in charge of a state board. These include schools for the blind and deaf at Baltimore and for the deaf at Frederick; hospitals for the insane at Sykesville and Spring Grove; a school for feeble-minded children at Owings Mills; an industrial and reform school for girls and one for boys at Baltimore; an industrial home for colored girls at Melvale. The state prison is at Baltimore; about half of the prisoners are negroes.

History. *Colonization.* The first settlement of white men in Maryland was a trading post established in 1631 on Kent's Island, by William Claiborne of Virginia. George Calvert, first Lord Baltimore, had obtained a grant from Charles I of the territory comprising the present states of Maryland and Delaware. This territory, intended as a refuge for Catholics, was in 1632 conferred by charter upon Cecilius Calvert, second Lord Baltimore. As proprietor, he was invested with sovereign powers, but he made no attempt to establish an absolute rule in the colony.

Early History. The peace of the colony was disturbed repeatedly by Claiborne, who refused to recognize Lord Baltimore, and by Virginian and English Protestants. The government was twice seized, but was restored definitely in 1715 to the fifth Lord Baltimore, a Protestant. Prosperity and peace were again disturbed by a boundary dispute with Pennsylvania, which was finally settled in 1767 by the establishment of the famous Mason and Dixon's line, which gave to the state its popular name.

Maryland took an important part in the French and Indian War. It was among the first colonies opposing the aggressions of England and took an important part in the Revolution. A constitution was adopted in November, 1776. Owing to her claims that the Northwest Territory belonged to the United States, Maryland refused to accept the national Constitution until after the passing of the Ordinance of 1787. On April 28, 1788, the state voted to adopt the Constitution of the United States, being the last of the thirteen colonies to do so.

Statehood. In the War of 1812 Maryland suffered from attacks made by the English fleet at Havre de Grace, Frederick, Baltimore and Fort McHenry. The last mentioned was the occasion of the writing of the *Star Spangled Banner,* by Francis Scott Key.

At the outbreak of the War of Secession Maryland, a border state, was torn by two great sympathies. Although a slaveholding state, the "Old Line State" did not secede, and its adherence to the Union doubtless saved Washington from falling to the Confederates.

From the election of Lincoln until 1896 the state favored Democratic policies, and again in 1912, when President Wilson carried the state. In 1914 two Democratic senators were elected. In June, 1915, the statutes passed by the state legislature making the "grandfather clause" applicable to individual cities, thus restricting the negro vote, were declared unconstitutional by the United States Supreme Court. E.B.P.

Consult Brown's *Maryland,* in American Commonwealths Series; Richardson's *Sidelights on Maryland History.*

Related Subjects. The following articles in these volumes will furnish further information as to the geography and life of Maryland:

CITIES

Annapolis	Frederick
Baltimore	Hagerstown
Cumberland	

HISTORY

Baltimore, Lord	Grandfather's Clause
Barbara Frietchie	Mason and Dixon's Line
Claiborne's Rebellion	Ordinance of 1787

LEADING PRODUCTS AND INDUSTRIES

Apple	Peach
Coal	Poultry
Corn	Strawberry
Dairying	Tobacco
Fish	Wheat
Oyster	

WATERS

Chesapeake Bay	Susquehanna River
Potomac	

MARY MAGDALENE, *mag'da leen,* a devoted follower of Jesus, born in the village of Magdala, from which she received her name, to distinguish her from the other Marys of the Bible. She is first mentioned by Luke, who names her at the head of the list of Galilean women who seem to have accompanied their Master in most of his ministries. Mary was distinguished as one out of whom Jesus "had cast seven devils," so she was not only impelled to follow him through life, but she stood by the Cross at the Crucifixion and was also the first to look upon the risen Lord on the Resurrection morning. She was not "the woman who was a sinner," mentioned in *Luke* VII, 37.

MARY STU'ART (1542-1587), better known as MARY, QUEEN OF SCOTS, has been called "the most beautiful, the weakest, the most attractive and most attracted of women." Her life story is one of the tragedies of history. She was the daughter of James V of Scotland and Mary of Guise, who belonged to a powerful and noble French family. The princess was only a week old when her father died, but she was at once proclaimed queen of Scotland. At the age of six she was sent to France to be educated, and there, ten years later, she was married to the young French dauphin, who came to the throne in 1558 as Francis II. See DAUPHIN.

Soon after the death of her husband, in 1560, she returned to her native land and began her rule as queen of the Scottish people. Mary was devoted to Roman Catholicism, but she seems to have made no attempt at first to oppose the establishment of Protestantism in the country. In 1665, however, she married her cousin, Henry Stuart, famed as Lord Darnley, a young Roman Catholic nobleman whose rise to power was the signal for a revolt on the part of the powerful Protestant lords of Scotland. The rebellion was quickly suppressed, but in the meantime the queen discovered that she had married a worthless profligate whose coarseness and unrestrained ambition were equally distasteful to her.

MARY, QUEEN OF SCOTS

In March, 1566, Mary's private secretary, David Rizzio, was dragged from her supper room and murdered. Though Darnley was one of the leaders in the outrage, his wife fled with him to Dunbar. Two months later a son, the future James I of England, was born to them. As time passed by the queen and her husband became more and more estranged, and Mary began to show marked attention to James Hepburn, Earl of Bothwell. Early in 1567, Darnley fell ill and was taken by his wife to Edinburgh. On the morning of February 10 the house in which he was lodged was blown up by gunpowder and he was killed, a crime which everyone believed was instigated by Bothwell. Whether Mary had any part in it will never be known, but she became the wife of the Earl only three months after the murder. See BOTHWELL, JAMES HEPBURN.

The beautiful and misguided queen had made a fatal mistake. The lords of Scotland rose in arms against her, and in 1567 she was forced to abdicate in favor of her infant son. After remaining for nearly a year a prisoner on the island of Lochleven, she succeeded in making her escape and in raising a small army to defend her rights. The quick defeat of her forces

having convinced her of the hopelessness of her position, she fled to England to entreat the protection of her cousin, the great Queen Elizabeth. The English queen, who saw in Mary a possible aspirant to the throne of England, kept her a prisoner for nineteen years. Finally she was accused of being one of the conspirators in a plot to assassinate Elizabeth, and though Mary steadfastly declared her innocence, she was found guilty and beheaded. The serenity and dignity with which she met her fate is beautifully described in Schiller's drama, *Maria Stuart,* which treats her life and character from a sympathetic viewpoint. B.M.W.

Consult Mumby's *Elizabeth and Mary Stuart;* Lang's *The Mystery of Mary Stuart.*

MASCAGNI, *mahs kahn'ye,* PIETRO (1863-), representative composer of the modern Italian school, whose opera, *Cavalleria Rusticana,* raised him in one night from utter poverty and obscurity to the height of fame. He was born at Leghorn, of humble parentage. Through the interest of an admirer, who early recognized his talent, Mascagni was enabled to enrol at the Milan Conservatory of Music; but he soon left his studies to begin a tour with an operatic troupe. Then began his struggles against poverty, for his income from teaching was very meager. Undaunted, however, he kept up the fight until the joyous news came, in 1891, that he had won the prize at Rome for his *Cavalleria Rusticana.* He later started on an operatic tour of America at the head of his own company. Although he has produced a number of other operas, *Ratcliff, L'Amico Fritz, Le Maschere, Iris* and others, none has approached his first success in merit or popularity.

MASE'FIELD, JOHN (1875-), an English "poet of the people," whose life has brought him into close touch with the poor and the unfortunate, and who writes of these experiences in an intensely realistic, sympathetic way. His works are "human documents" —pages out of the great book of everyday life.

JOHN MASEFIELD

Masefield was born on a farm in Ledbury, England. He ran away to sea when a boy of fourteen and voyaged all over the world, meeting with many fascinating adventures, upon which he has since drawn for his sketches, romances, and poems about the sea. Among these are *Salt-Water Ballads, A Mainsail Haul, Captain Margaret, The Story of a Round-House,* and *On the Spanish Main,* all of which have about them the spell of the sea. At one time he worked as porter in a Sixth Avenue saloon in New York. He has lived in the lowest slums of London, and has associated with men and women in nearly every walk of life. During the War of the Nations he devoted himself largely to Red Cross work, giving freely of money and personal service. The interest which American readers take in his writings was greatly enhanced by a series of lectures which he delivered in the United States and Canada in 1915-1916.

Masefield's poems are graphic pictures of human experience. They read more like interesting stories than poems, the narrative portions being put in the rough, vivid, everyday speech of the people whose story the poet is telling. Naturally, therefore, the language is sometimes coarse and irreverent; and this is a feature that many readers object to on the ground that it is out of place in poetry.

The Widow in the Bye Street, The Everlasting Mercy and *The Daffodil Fields* are among his best-known longer poems, telling, in verse that reads like a rhymed chant, pathetic tales of love and tragedy among the simple folk of Shropshire. His writings also include *Good Friday and Other Poems,* a collection of his later verse; *The Tragedy of Nan, Philip the King* and *The Tragedy of Pompey the Great,* dramas; and *Jim Davis,* a story for boys.

MASHONALAND, *ma sho'na land,* a province in the northeastern part of the British colony of Southern Rhodesia (see RHODESIA), in South Africa, between Matabeleland and the Zambezi River. Matabeleland and Mashonaland are the two political divisions of Southern Rhodesia. Mashonaland is a fertile river-watered plateau, high enough above sea level—2,000 to 3,000 feet—to be healthful for natives of temperate countries. It was formerly a rich gold territory, and gold is still found there. Though little is known of the early history of the land, extensive remains of temples, forts, altars, gold smelters, pottery, etc., found along the gold reefs, indicate that at one time a people of an advanced stage of civilization dwelt in Mashonaland. The natives, who are of the Bantu negro race, are peace-loving farm-

ers, fond of music and skilled in pottery and gold work (see BANTU). Salisbury, the capital of Southern Rhodesia, is an important town of Mashonaland. In 1911 the native population was 495,450.

MASK, a disguise or covering for the face. It was first used among the ancient Greek peasants at their harvest festivals, when they wished to impersonate some one, and later at the ceremonies attending the worship of Dionysus or Bacchus. In modern times the only mask most widely used is the *domino,* or half mask, worn at costume balls and masquerades.

In Greek tragedy, which was an outgrowth of religious ceremonies, masks were used, and soon after they were introduced into comedy. Different characters wore them to represent such emotions as fear, hate, joy, love and sorrow. Often metallic mouthpieces were placed inside of the mask to increase the power of the voice, so that it could be heard in the large, open theaters.

Among certain groups of savages along the North Pacific coast of North America and in the islands of the south seas, masks made to look like hideous animals or mythological characters form a very important part in religious rites and dances. Other savages wear them to frighten away demons.

False Faces are pasteboard or cloth masks representing human faces, which are usually made as hideous as possible. To make these faces, a sculptor uses his moist modeling clay to form the features, and a hollow plaster of Paris cast is made of the model thus formed. Then pasteboard is soaked in water until it is soft and mushy, for in this condition it will fit into every curve and crack in the plaster mold. After the first layer has been carefully pressed upon the mold, another layer is added and then another, until it is thick enough to hold its shape firmly. Flour paste is used to hold the layers together. After the faces are dried, they are grotesquely covered with paint, and sometimes hair, mustache and whiskers are glued in their proper positions.

MASON AND DIXON'S LINE, in geography, the straight east-and-west line separating the states of Maryland and Pennsylvania; in history, an extension of that line roughly marked the division between slaveholding and free states before the War of Secession.

The geographic line was surveyed and marked by milestones between the years 1763 and 1767. This was done as a result of a controversy between the families of William Penn and of the Lords Baltimore, possessors of Pennsylvania and Maryland, respectively. The work was performed by two English surveyors, Charles Mason and Jeremiah Dixon, hence the name. All the milestones were marked on one side with an *M* for Maryland and on the other with *P* for Pennsylvania. Every fifth stone bore the arms of the two state owners. Through the years many of these stones were removed and used as doorsteps, curbstones, foundations and for other purposes. Later, controversies arose, but surveys made in 1849 and in 1900 showed no important error, and the line has remained at the parallel of 39° 43′ 26.3″ north latitude. Nearly all of the 500-pound milestones have been recovered and replaced.

MASON AND SLIDELL′. The names of James M. Mason and John Slidell are prominent in American history because of an episode that nearly involved the United States in hostilities with Great Britain, during the War of Secession. Late in the year 1861 they were appointed commissioners to England and France, respectively, by the Confederate government, and in October of that year sailed from Havana on the British steamer *Trent.* In November the vessel was stopped by the Union sloop of war, *San Jacinto,* in command of Captain Wilkes, who took Mason and Slidell as prisoners to Fort Warren, in Boston Harbor. The prompt disavowal of the act on the part of the Federal government and the release of the prisoners averted war between the United States and England (see TRENT AFFAIR, THE).

James Murray Mason (1798-1871) was born on Mason's Island, Fairfax County, Va. After his graduation from the University of Pennsylvania, in 1818, he began the practice of law in Winchester, Va., soon becoming prominent in the political life of his state. In 1837 he became a member of the national House of Representatives, and from 1847 to 1861 served in the Senate. The Fugitive Slave Law, introduced into the famous Compromise of 1850, was drafted by him (see COMPROMISE OF 1850). After the *Trent* affair he proceeded to England, but was unsuccessful in winning recognition for the Confederacy. Returning to America after the war, he lived in Canada until 1868, and from that date until his death, near Winchester, Va.

John Slidell (1793-1871) was born in New York City and educated at Columbia College (now Columbia University). Having removed to New Orleans in 1818, he served as United States district attorney for Louisiana from

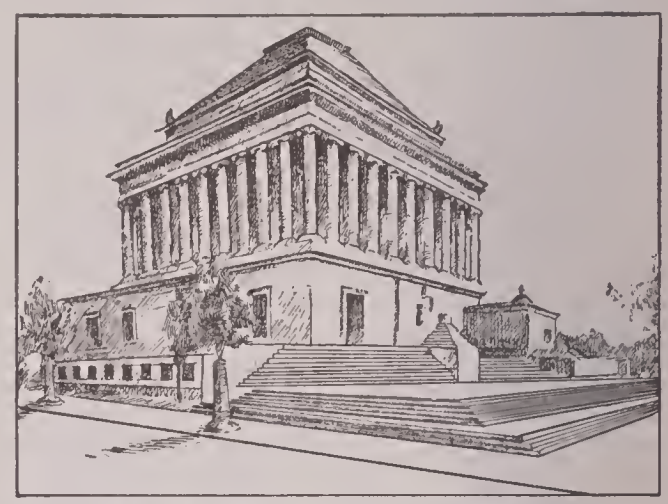
1829 to 1833, and from 1853 until the secession of Louisiana represented that state in the United States Senate. After his release from Fort Warren, he went to France, where he began negotiations for a loan to the Confederate government. At the close of the war he removed to England, where he remained the rest of his life.

MASON CITY, Iowa, a distributing point of importance and the county seat of Cerro Gordo County, is situated in the northern part of the state, midway between the eastern and western borders, on Lime Creek. Fort Dodge is seventy-two miles southwest and Des Moines, the state capital, is 115 miles south. Transportation facilities are provided by the Chicago & North Western, the Chicago Great Western, the Chicago, Milwaukee & Saint Paul, the Chicago, Rock Island & Pacific and the Minneapolis & Saint Louis railroads. An electric line extends westward. Mason City was settled in 1855. In 1913 the commission form of government was adopted. The population, which is steadily growing, increased from 11,230 in 1910 to 14,457 in 1916 (Federal estimate). Fourteen square miles comprise the city's area.

Owing to its shipping advantages, Mason City is the trade center and distributing point for an extensive agricultural and stock-raising section. The city has large wholesale houses and does a considerable business in grain, groceries and fruits. Valuable sandstone and fire clay are found in the vicinity, and the quarrying of sandstone and the manufacture of brick and tile are important industries. The city also produces gasoline engines and cement, and has a large packing house. Noteworthy features are the Odd Fellows' Orphans' Home, the courthouse and a public library.

MA'SONRY, or **FREE'MASONRY,** the largest and probably the oldest secret organization in the world. Of its true origin history tells nothing; many of its members claim that it was founded at the building of Solomon's Temple, but others declare it to be a product of the Middle Ages. It is known that in the thirteenth century, and perhaps earlier, the stone-workers of the British Isles and Western Europe were organized into guilds with the usual three degrees of master, journeyman and apprentice (see Guild). Many large cathedrals were built in those days, and the masons traveled from town to town as their help was needed. In 1275 and in 1375 guilds of traveling masons had general assemblies in Frankfurt, and the fraternal organization there formed, with secret ceremonies and signs, may have been the beginning of the modern Masonic Order.

The modern organization of Free and Accepted Masons dates from the year 1717. Over a century earlier the British orders had admitted to membership others than actual masons, calling them *accepted* masons. The members who practiced the trade were termed *free,* for



MASONRY'S GREATEST TEMPLE

Headquarters of Scottish Rite Masonry, at Washington, D. C., completed in 1916. The building was fashioned after the famous tomb of Mausolus, accounted the fifth of the seven wonders of the ancient world (see Mausoleum). The Washington Temple cost $2,000,000.

what reason no one really knows. After the era of cathedral building had passed, there had been a decline in the importance of masonry, and the revival of 1717 was brought about by *accepted* members, one of the most prominent being a clergyman. Four lodges met in London and formed the first Grand Lodge, and the three degrees which they instituted are still the basis of the Masonic Order. Any man who receives the first three degrees is as truly a Mason as he whose ambition carries him through the most exalted degree, the thirty-third, in the Scottish Rite (see below).

From this Grand Lodge of England have grown thousands of lodges, scattered throughout the world. Other degrees of initiation have been added to the original three, but there is no uniformity in their application. The Scottish Rite, which contains thirty-three degrees, was organized in Charleston, S. C., in 1801, based on rituals which had been developed in France. There are more than a million and a half Master Masons in the United States and about one hundred thousand in Canada.

The Masonic Degrees. The various steps in Masonry can be explained briefly after the following plan. The letter "Y" may represent the basis of the Order and its branches: The stem of the letter may stand for the first three de-

grees—all there is or ever was of Ancient Craft Masonry—the so-called Blue Lodge, whose three degrees are—

1. Entered Apprentice
2. Fellowcraft
3. Master Mason

But Masonry invites its members to seek further light in the Order. That they may receive it two ways have been prepared for them, and any Master Mason may choose either one or both of them. These are called the York, or American Rite, and the Scottish Rite. Should the candidate elect the York Rite he would climb by one of the forks of the Y; should he prefer the Scottish Rite he would follow the other fork. In either direction he would eventually reach the thirty-second degree, and be eligible for the great social club known as the Mystic Shrine.

[The Shrine is not *Masonry;* it is not a Masonic institution, nor is it recognized by any Grand Lodge. It is simply a social organization.]

If the candidate elects the York Rite his progress through the degrees in the *Chapter* is as follows:

4. Mark Master
5. Past Master
6. Most Excellent Master
7. Royal Arch Mason

He may then enter the *Council of Royal and Select Masters* and receive two degrees:

8. Royal Master
9. Select Master

Following the Council comes the *Commandery of Knights Templars,* with three degrees:

10. Red Cross Knight
11. Knight of Malta
12. Knight Templar

The preceding steps include all of the York Rite. A candidate wishing to ascend by the Scottish Rite applies for membership in a *Lodge of Perfection,* where the following degrees are conferred:

4. Secret Master
5. Perfect Master
6. Intimate Secretary
7. Provost and Judge
8. Intendant of the Building
9. Elu of the Nine
10. Elu of the Fifteen
11. Elu of the Twelve
12. Master Architect
13. Royal Arch of Solomon
14. Perfect Elu

If the candidate elects to travel farther on the road, he takes four degrees in *Chapter Rose Croix:*

15. Knight of the East
16. Prince of Jerusalem
17. Knight of the East and West
18. Knight of the Rose Croix.

The next step is the *Council of Kadosh,* with twelve degrees:

19. Pontiff
20. Master of the Symbolic Lodge
21. Noachite, or Prussian Knight
22. Knight of the Royal Axe, or Prince of Libanus
23. Chief of the Tabernacle
24. Prince of the Tabernacle
25. Knight of the Brazen Serpent
26. Prince of Mercy
27. Knight Commander
28. Knight of Sun, or Prince Adept
29. Scottish Knight of Saint Andrew
30. Prince Kadosh

Following the above is the *Consistory,* with two degrees:

31. Inspector Inquisitor
32. Master of the Royal Secret

The seeker after Masonic light who has gone thus far has received all the degrees that most men can obtain. There is but one more degree:

33. Inspector General

This latter degree is of the *Supreme Council.* It cannot, like the others, be obtained upon application and by the payment of a fee. It is conferred upon a very limited number and then only as a special appreciation of work in the Masonic bodies, and the aspirant for the honor must be recommended. E.D.F.

MASQUE, *mask,* a form of dramatic entertainment named from the masks which the performers wore. At its introduction, in the time of Henry VIII, it was little more than a pageant or spectacle, but dramatic features were added, music was given a greater part, and very elaborate, fanciful plots were worked out. These performances were given privately more often than on the stage, and particularly at court, where the chief nobles with their ladies took part. No expense was spared, and the greatest artists were employed in the staging of these miniature plays. Perhaps of all who wrote masques Ben Jonson appreciated most thoroughly the limitations and the demands of that special form of drama, and those of his which remain are charming in plan and in execution alike. Milton's *Comus,* one of the most famous masques ever written, was produced during the reign of Charles I, when the popularity of such productions was declining. Exquisite as this is, it is designed to be read rather than to be acted, and the same has been true of most masques written since that time.

MASS, in the Roman Catholic Church, the celebration of the sacrifice of the Eucharist, commemorating the passion or suffering and death of Christ. There are four principal parts in a mass, the gospel, the offertory, the conse-

cration and the communion. Besides these, there are several smaller parts, each symbolic of some episode in Christ's life, during the days immediately preceding its close. The mass is read, or sung, in Latin by the celebrant, but the whole ceremony is translated into various languages, for the comprehension of the people. Mass can be celebrated only by the clergy, after they have fasted absolutely from the midnight previous.

Though there are different names for masses, the fundamentals are the same. In a *low* mass, there are no responses from the choir; at *high* mass the responses are sung by the choristers, usually with instrumental accompaniment; a *solemn high* mass is the same as a high mass, except that the celebrant is attended by a deacon and subdeacon. *Requiem* mass is recited for the repose of the souls of the dead, and a *votive* mass is one different from that prescribed for the day, the choice being left to the celebrant. Each priest may say one mass on week days, two on Sundays if necessity requires it, and three on Christmas day. G.W.M.

THE STORY OF MASSACHUSETTS

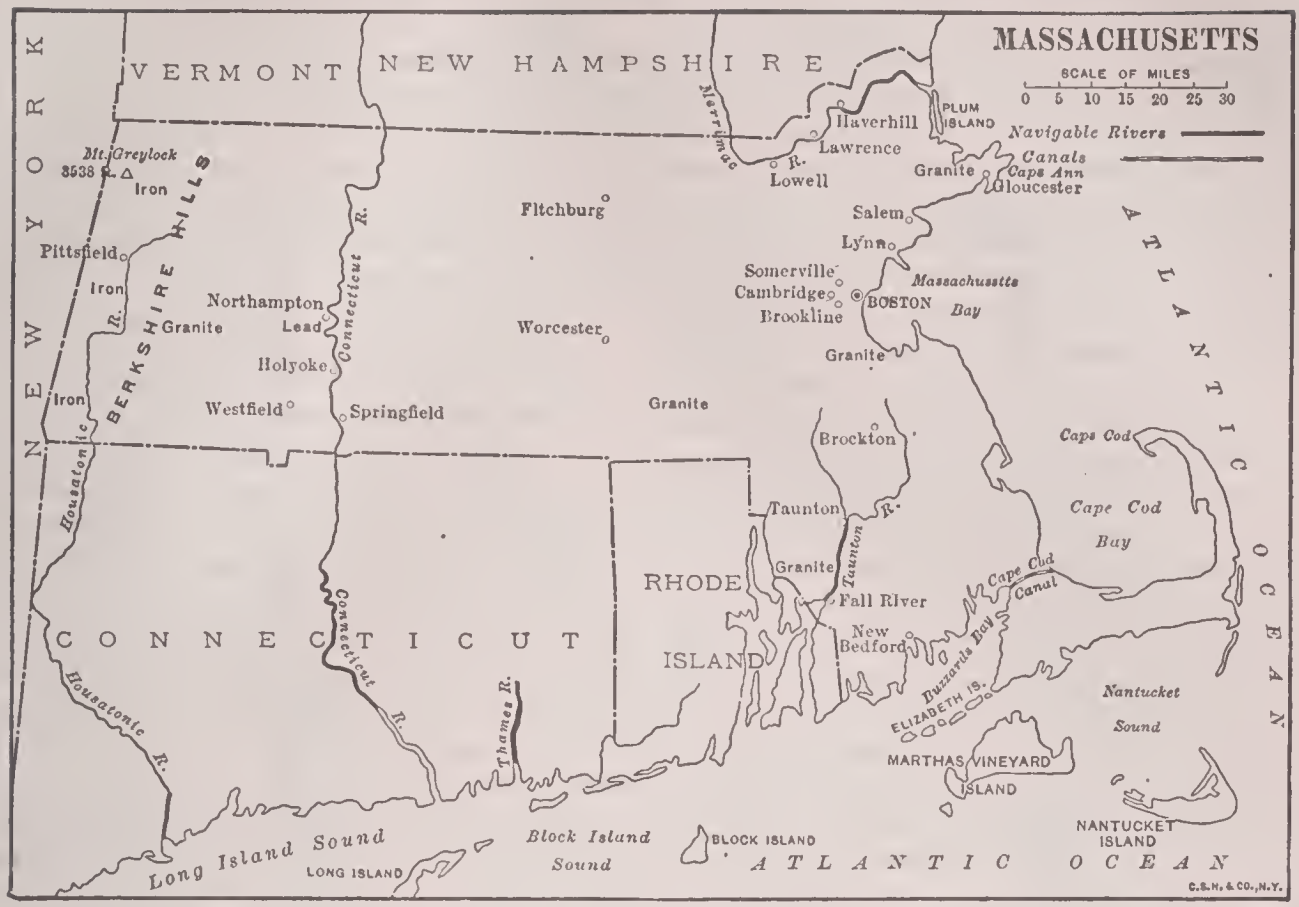
MASSACHUSETTS, *mas a chu' sets,* one of the thirteen original states of the American Union, perhaps the foremost among the colonies in the formation of that Union. It is a little state, only four out of the forty-eight ranking below it in size, but no state has had a more romantic history or one of greater importance to the country. Its name, obviously Indian in origin, and meaning *near the great hills,* was borne by a tribe of Indians who lived in the region before the coming of the white man, while the popular name, *Old Bay State,* has reference to the great bay on which Boston is situated.

Location and Size. Massachusetts is a North Atlantic state, one of the famous group known as New England. A large part of it is less than a degree in width from north to south, lying between 42° and 42° 43′ north, but to the east the state widens considerably, so it has with its capes and peninsulas an Atlantic coast line of more than 250 miles. Its farthest point north is 114 miles from its extreme southern point. From east to west its greatest length is 184 miles, and it has an area of 8,266 square miles, of which 227 square miles are water surface.

The People. This little state is exceeded by but five states in number of inhabitants, possessing in 1915 a population of 3,693,310. In density of population it is surpassed only by Rhode Island, for it has an average of 459.4 people to the square mile. The population, with the exception of 40,000 negroes, is almost equally divided among native-born whites with native-born parents, native whites with foreign or mixed parents, and foreign-born people, each class making up a little more than thirty per cent of the population. This state, with its coastal location and its thriving industries, has offered a very attractive field to immigrants. Among the foreign-born inhabitants the Irish are most numerous, and Canadians rank second.

No other state, whatever its size, has so many good-sized towns as Massachusetts, which at the census in 1915 showed no fewer than seventy-two with a population over 8,000; while over ninety per cent of the inhabitants live in cities of 2,500 or more. Boston, the capital and chief manufacturing center, is the largest city; others of importance, in the order of their size, are Worcester, Fall River, New Bedford, Cambridge, Lowell, Springfield, Lynn, Lawrence, Somerville, Brockton and Holyoke. All of these, and others, are given separate treatment in these volumes.

A Literary Center. Any account of its people would fail to do justice to the large place which Massachusetts has held in the life of the United States if it took no notice of the intellectual activities in which the state has always been preëminent. It is to the permanent fame of Massachusetts that it includes among its great writers Bryant, Longfellow, Lowell, Whittier, Holmes, Franklin, Emerson, Prescott, Mot-



OUTLINE MAP OF MASSACHUSETTS

Showing the boundaries of the state, the navigable rivers, principal cities, location of minerals, quarrying centers, and the highest point of land in the state.

ley, Parkman, Mann, Phillips, Hawthorne, Mrs. Stowe, not to mention many of scarcely inferior fame. Their part in the history of America has been little less important than the services of Massachusetts statesmen, foremost among whom were John Adams, John Quincy Adams and Daniel Webster.

Coast and Surface. The sea coast is very irregular, and is dotted with scores of islands, many of them very small, but some, as Nantucket, Martha's Vineyard and the Elizabeth Islands, of considerable size. There are numerous excellent harbors, Boston ranking first, and New Bedford, on Buzzard's Bay, second, but there is a long stretch of low coast with many "spits" of sand stretching south from Boston and all along the Cape Cod peninsula, and here good ports are few. To the north of Boston the shore line is rocky and picturesque, and there most of the harbors are to be found. The most conspicuous feature of the coast region is the peninsula of Cape Cod, which juts into the sea like a long arm bent at the elbow, thirty-five miles from shoulder to elbow and thirty from elbow to hand.

All of this eastern section is low and level, with a gradual, undulating rise toward the west and northwest; the rest of the state is divided into three chief surface regions. Just west of this sandy lowland is a plateau about 1,100 feet in height—a beautiful region with stream-carved valleys and low, rounded hills. Then comes the Connecticut Valley, broad and fertile, from the level of which rise here and there hills which reach a height of 1,200 feet or more. Mount Tom, Mount Holyoke and other lower peaks are particularly interesting to the geologist because they show so clearly how the occasional streaks of hard rock resisted when the river was cutting its valley through the soft shales and sandstones (see EROSION). In the extreme west is the Berkshire country, one of the loveliest regions in the United States, crossed from north to south by extensions of the Green Mountains known as the Berkshire Hills. Long hill ridges, wooded to the top, are intersected by deep valleys in which lie so many clear blue lakes that the section is called the Lake Region of America. The summits present a remarkably even sky line, but some of them rise far above their fellows, Saddle Mountain, or Greylock, in the northern part of the state, reaching a height of 3,538 feet, the highest point in Massachusetts. This beautiful scenic section is a favorite resort region, and has many little villages which in the winter are shut away from

the world by snow and impassable roads, but in the summer overflow with visitors.

Rivers. Massachusetts is well drained by its many rivers, the chief of which is the Connecticut, which flows in a north and south direction across the state. Its most important tributaries are, from the east, Millers and the Chicopee, and from the west the Deerfield and the Westfield. In the northeast is the Merrimac, which has a course of but thirty-five miles within the state but receives the waters of the Concord and the Nashua. Other rivers of importance are the Housatonic, famous for its picturesque scenery, the Hoosac, which flows northwestward into the Hudson; the Charles, with its literary and historic associations; the Taunton and the Blackstone. Few of these rivers, flowing through their deep, wide valleys, are fitted for navigation, so broken are they by falls and rapids, but this does not mean that they are of no importance industrially. Indeed, Massachusetts owes its manufacturing supremacy largely to its rivers, for they furnish unlimited water power; and the chief fall lines in the different rivers are marked by the location of such industrial cities as Lowell, Haverhill, Waltham and Lawrence. See FALL LINE.

Climate. Mark Twain declared that the climate of New England was made and managed by one of Nature's unskilful journeymen, so changeable and unsettled is it; and Massachusetts has its full share of this journeyman weather. Extremes of heat and cold are great, the changes in temperature are often very abrupt, and spring is frequently almost nonexistent. In the mountainous region to the west the winters are likely to be very severe, but farther east the ocean exercises a tempering influence. Autumn is the pleasantest season, and is often very beautiful, especially in the hill country. Rainfall is everywhere plentiful, ranging from forty to forty-five inches a year.

Resources and Industries. *Minerals.* The one great mineral product of Massachusetts is granite, in which for many years it was the leading state. In recent years, however, Vermont surpasses it, though its yield is still valued at more than $2,000,000 a year. Other building-stones, of which the most important is the brown sandstone found in the Connecticut Valley; limestone, used chiefly in the manufacture of large quantities of lime; excellent clay; emery, of which the state is one of the chief producers; and such minor products as fuller's earth, feldspar and iron pyrites, make up the remainder of the mineral output of Massachusetts.

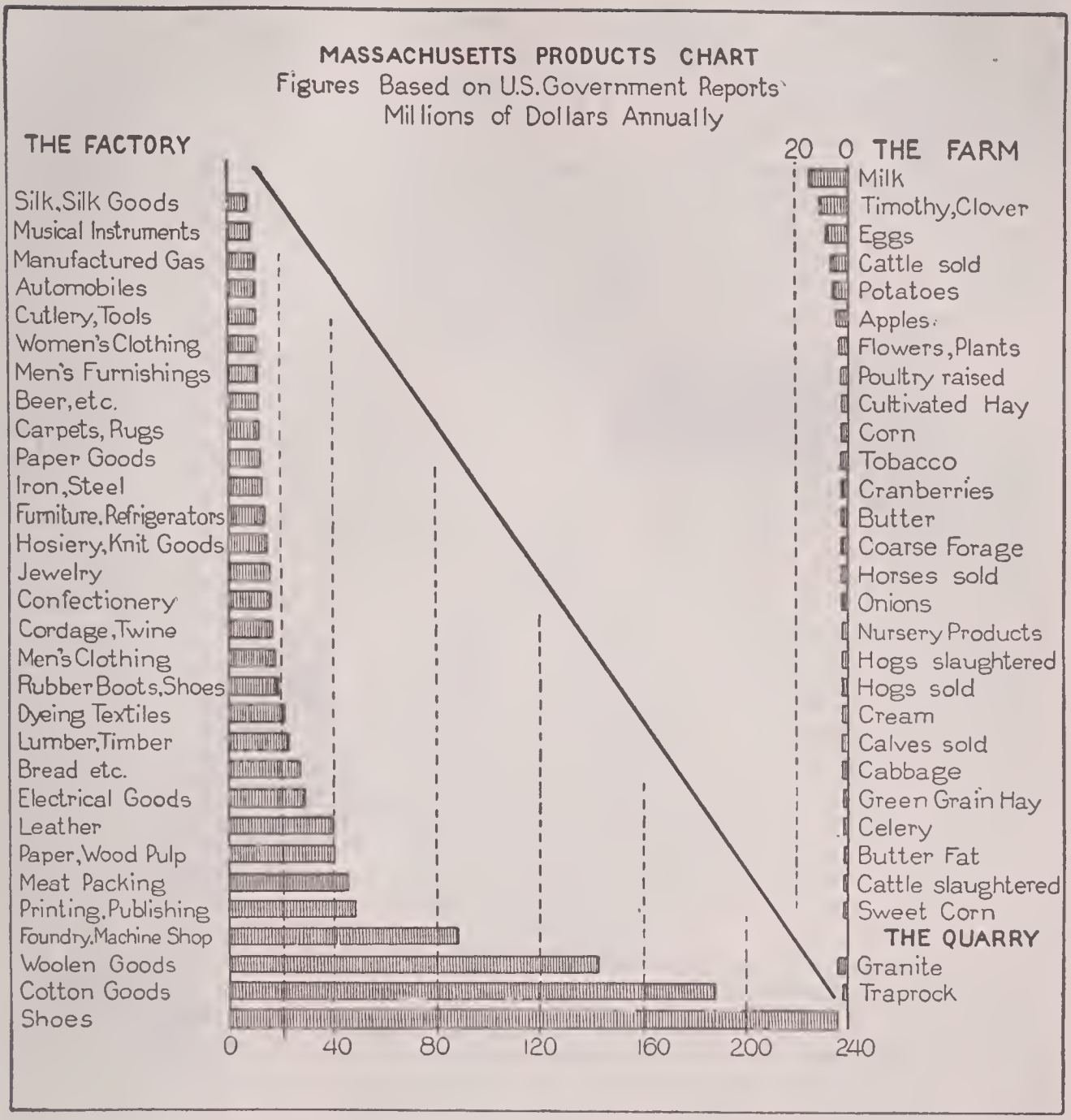
Fisheries. These have been of importance since the very beginning of the colony, and today the product of the fisheries of Massachusetts exceeds that of any other state. Whales are no longer captured off Nantucket Island, as in the olden days, but all along the coast there are towns whose sole industry is fishing. Chief of these is Gloucester.

> Scattering wide, or blown in ranks,
> Yellow and white and brown,
> Boats and boats from the fishing banks
> Come home to Gloucester town,

wrote William Vaughn Moody; for there are regular fleets of fishing boats, which do not merely hover about the home coast, but set sail for the Grand Banks of Newfoundland and bring home vast stores of cod and mackerel. Life on these fishing boats and in the fishing villages is one of the most characteristic forms of New England life, and such books as Kipling's *Captains Courageous* owe their charm to their graphic pictures of it.

Besides the two varieties of fish mentioned above the most valuable kinds taken are haddock, halibut, herring, hake, lobsters and pollack, while on the southern coast there are extensive oyster beds. The station which the United States Fish Commission maintains at Woods Hole, on Buzzard's Bay, is important.

Agriculture. Much has been said and written in recent years of the exhausted farms of New England; indeed, the soil of Massachusetts, except in a few of the river valleys, is not very fertile. The hillsides are stony and overgrown with trees, and only about forty per cent of the area of the state is actually improved farm land. Agriculture, therefore, that industry to which the earliest colonists turned for their very existence, is no longer of prime importance to the state. Formerly cereals were raised in considerable quantities, but Massachusetts no longer tries to compete with the great wheat and corn-growing states to the west. However, the large number of cities in the state makes one thing very desirable—that plenty of vegetables, poultry, fruit and dairy products be produced to supply the cities; and the carefully-cultivated truck farms are perhaps the most valuable agricultural land in the state. Many kinds of orchard fruits, especially apples, grow very well, and small fruits are grown in abundance. A very characteristic industry is the growing of cranberries on the marshy lands of Cape Cod and its vicinity; another of historic interest is the raising of tobacco in the Connecticut Valley, which was carried on in colonial days.



Manufacturing. This is the great industry of the state, which owes most of its mills and factories, as stated above, to its ready supply of water power. Only New York, Pennsylvania and Illinois produce manufactured goods in greater amount, and in a number of important branches of industry Massachusetts is easily first. For instance, no other state compares with it in the manufacture of boots and shoes, more than a hundred million pairs coming from its factories every year, to say nothing of the vast amount of accessories and cut stock. Almost half of the footwear made in the United States is produced in Massachusetts. Of even greater importance than boot and shoe making are the combined cotton and woolen industries, which produce in a year goods valued at almost $400,000,000. Massachusetts leads all the states in the production of cotton, woolen, worsted and felt goods, stands high in the list of producers of carpets, rugs and silks, and makes more cordage and twine than any other state. Near to these in importance are the manufacture of foundry and machine-shop products, printing and publishing, meat packing, and the making of leather goods and of wood pulp.

Many of the industries are rather sharply localized, though Boston, by far the largest manufacturing center in the state, exhibits wide variety. Lawrence, the second city in the value of its manufactures, ranks foremost among the cities of the United States in the production of woolen and worsted goods; Fall River, Lowell and New Bedford make more cotton goods than any other cities in the country; Lynn, Brockton and Haverhill are the great centers of the

boot and shoe industry; the paper mills of Holyoke are famous the world over for the fine quality of writing paper and book paper which they produce; and Waltham has one of the largest watch factories in the world. In fact, cities which are not manufacturing centers are almost unknown in Massachusetts, and many of the smaller towns owe their existence to their industries.

Transportation and Commerce. Massachusetts was a pioneer in railway-building, the very first track ever laid in the United States having been one for the so-called Quincy Railroad, over which granite was carried for the Bunker Hill Monument. The first steam railroad in the state, however was not begun until eight years later, in 1835. The great industrial development of the state has made necessary good transportation facilities, and to-day only New Jersey has a larger mileage per 100 square miles of territory. Boston is the chief railroad center, and most of the lines converge there, connecting practically all of the cities of the state more or less directly with the capital and industrial center. Electric railways have increased rapidly, and at present their total mileage, over 3,000, is about fifty per cent greater than that of the steam railroads. The highway commission of the state is very active, and roads are for the most part excellently kept up. The annual appropriations make provision for the planting of roadside trees.

The commerce, which is very extensive, centers in Boston, second only to New York in importance among Atlantic seaports. One of the first things the early settlers did, when towns began to spring up along the shore, was to establish a coastwise trade, and this grew and expanded until to-day Boston has direct steamship connection not only with other United States ports, but with the leading ports of Europe as well. Much that is sent out from the state is goods received for foreign shipment from other parts of the country, but large quantities of manufactured goods and fish are shipped, as well. The imports, which consist largely of such raw materials as wool, cotton, jute, leather and cereals, surpass the exports.

The Cape Cod Canal, opened on July 29, 1914, brings Boston into closer touch with the ports south of Cape Cod; for it not only shortens the distance by seventy miles, but makes the voyage far less dangerous. See CAPE COD CANAL.

Education. Massachusetts has the proud distinction of having established the first free school and the first college in the Western hemisphere. Interest in education has never lagged since those early days, and to-day the school system ranks among the very best in the world. If the state did not have such a large foreign-born population its illiteracy percentage would be the lowest in the United States, for of the native-born inhabitants ten years of age and over, only four-tenths of one per cent cannot read and write. Counting in the foreign-born population, the total illiteracy percentage is 5.2.

At the head of the system is a board of education, and not only Massachusetts, but every other state in the Union as well owes much to Horace Mann, the very first secretary the board ever had (see MANN, HORACE). Taxation provides for most of the expenses, but needy towns which cannot thus support their schools receive aid from the interest on the state school fund. Each town which has a certain amount of taxable property must employ a skilled superintendent, and smaller towns must belong to superintendency unions, which receive help from the state in the payment of the superintendent's salary. Towns which have at least 500 families must maintain a public high school, and there are at present in the state 270 of these secondary institutions, with an average of ten teachers to each. There are also night schools in large number, continuation schools for children who must work, and ten state normal schools, but there is no state university. Massachusetts has, however, an unusual number of such higher institutions of first rank, chief among them being Harvard University, the oldest college in the United States; Amherst College, Boston University, Williams College, Tufts College, Clark University, Massachusetts Institute of Technology, the College of the Holy Cross and Boston College. Especially for women are Radcliffe College, closely allied with Harvard; Mount Holyoke College, Wellesley College, Smith College and Simmons College. In addition there are many academies and technical and professional schools.

Religion. Until the middle of the nineteenth century, Massachusetts had a comparatively small proportion of Roman Catholics, but the Irish and the French Canadians who flocked to the state changed the religious condition, so now the Roman Catholics far outnumber all the Protestant denominations combined. Only two states in the Union have a larger proportion of Catholics to population. Of the Protestant sects, all of which are well represented, the strongest are the Congregationalists, and this

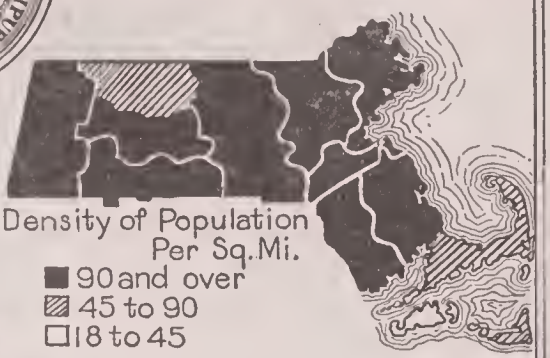
MASSACHUSETTS

The Midnight Ride of Paul Revere

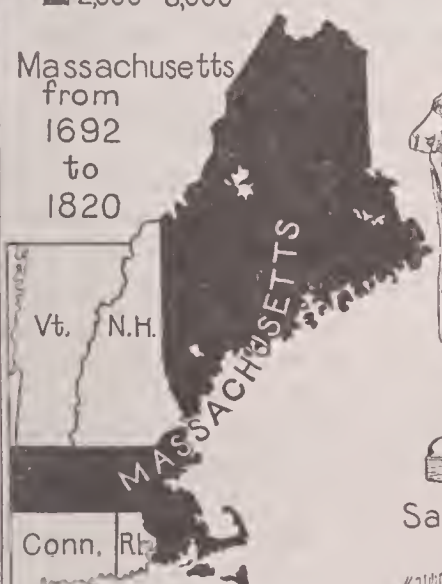
State Seal

Physical Map

Altitude
- Below 100 Feet
- 100 to 500 "
- 500 " 1,000 "
- 1,000 " 2,000 " "
- 2,000 " 3,000 " "



Density of Population Per Sq. Mi.
- 90 and over
- 45 to 90
- 18 to 45



Massachusetts from 1692 to 1820

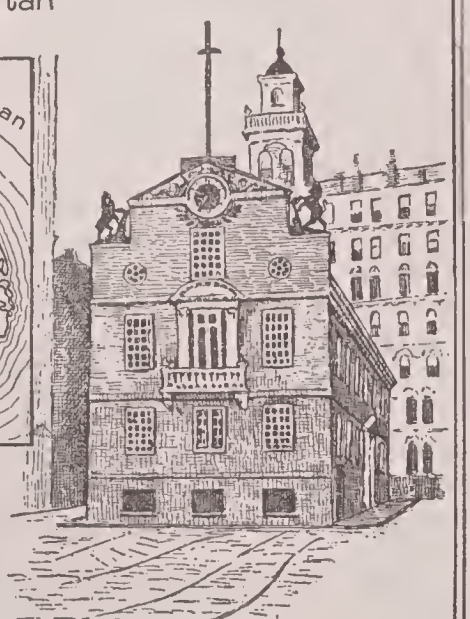
Saint-Gaudens "The Puritan" (in Springfield)

419	1910
349	1900
278	1890
222	1880
181	1870
153	1860
124	1850
92	1840
76	1830
65	1820
59	1810
52	1800
47	1790

Increase in Population Per Sq. Mi.

John Harvard Statue Cambridge

Religions



The Old State House Boston

seems but natural, since in the old days Massachusetts was a strictly Congregational colony. The state has also been the center of the Christian Science movement.

Charitable and Penal Institutions. At the head of the charities is the state board of charities, which has wider powers than similar boards in most other states. Among the institutions over which they have control are the hospitals for the insane, at Danvers, Medford, Northampton, Taunton, Westboro and Worcester; the school for the feeble-minded, at Waltham; the hospital school for crippled children, at Canton; the infirmary, at Tewksbury; four state sanatoriums, at North Reading, Rutland, Lakeville and Wakefield; the hospital for epileptics, at Monson, and for lepers, on Penikese Island; the famous Perkins Institution and Massachusetts School for the Blind, at Boston; and several schools for the deaf.

Penal institutions, under the control of a board of prison commissioners, are administered very effectively, since degrees of criminality are recognized and reformatory influences are brought to bear on such as have not proved themselves hardened. The state prison is at Boston; there is a reformatory for women at Sherborn and one for men at Concord; industrial schools for girls and boys, and a prison camp and hospital, at Rutland.

Government. The state is governed under a constitution which dates from 1780, but a constitutional convention was called to meet in Boston in June, 1917, to frame a new constitution to supplant the document framed in Revolutionary days. The present one provides for an executive department, which consists of a governor, lieutenant governor, secretary, treasurer, receiver-general, auditor and attorney-general, each elected for a term of one year, the governor being assisted by a council of eight members. There is a legislature, or general court, of two houses, a senate of forty members and a house of representatives of 240 members, each elected annually; and for a judiciary there is a supreme judicial court and a superior court, and each county has its probate court and court of solvency. All the judges are appointed by the governor, with the approval of the council, and hold office during good behavior.

The unit of local government is the township, or as it is called in New England, the *town;* it was in the Massachusetts colony that this form of government originated, the old town meeting having served to teach many of the colonists the principles of self-government. Selectmen, elected at the town meetings, are at the head of affairs in unincorporated towns, but cities of 12,000 or more may establish regular municipal governments. The constitution permits the commission form of government to any city that cares to adopt it.

Special Provisions. Massachusetts allows women to vote only for school committeemen. There are on the statute books direct primary laws, strict child-labor laws, laws against the white-slave traffic and statutes regulating the working hours of women. The liquor traffic has been regulated since 1881 by local option laws, and a majority of the towns are prohibition territory.

History. *First Century.* Perhaps the coast of Massachusetts was visited by the Norsemen about the year 1000; certainly it was explored in 1602 by Bartholomew Gosnold, and in 1614 by John Smith, who made maps of it which long remained in use. But its real history began in 1620,

> When a band of exiles moored their bark
> On a wild New England shore.

These were the Pilgrims or Puritans, 102 in number, who had left England because they were not allowed freedom of worship, lived for a time in Holland, and then, determined to found a home of their own, braved the terrors of the little-known seas, and on December 11, 1620 (December 21, according to the revised calendar), landed at Plymouth. The suffering of these colonists of the *Mayflower* was intense, and almost half of them died during the first winter, but in the summer of 1623 their crops flourished, and the next winter was one of comparative comfort. Others of the Puritans kept coming from Holland, and within twenty years after the first Pilgrims had landed, Plymouth Colony boasted eight towns and over 2,500 inhabitants.

Meanwhile, in 1629, a royal charter had been obtained for the "Massachusetts Bay Colony," which had sprung up in the vicinity of Salem, and this latter colony grew rapidly between 1630 and 1640, when the struggle in England between king and Parliament was making it especially unpleasant for the Puritans. Not until 1692 was Plymouth Colony, which had applied again and again in vain for a royal charter, united with Massachusetts Bay under one charter, and this latter was considerably less favorable than the earlier instrument.

From the first Massachusetts Bay Colony had a life far less peaceful than that of Ply-

RESEARCH QUESTIONS ON MASSACHUSETTS

(An Outline suitable for Massachusetts will be found with the article "State.")

What very interesting phase of physical geography is illustrated by the outstanding peaks of the Connecticut Valley?

What does the name Waltham immediately suggest to you?

Which city has the largest manufacturing industries?

What is there especially interesting about the unit of local government in Massachusetts?

What laws show the progressive character of the state?

What is the "long arm" of Massachusetts?

What articles that we wear every day are manufactured in larger quantities by Massachusetts than by any other state?

What part did Massachusetts play in the abolition movement?

What was the *Liberator?*

What effect would it have on the literary history of the country if Massachusetts and all its writers were blotted out?

Why does Massachusetts no longer raise cereals? What characteristic of the state determines one of its chief agricultural pursuits?

What change did immigration make in the religious statistics?

Who were the Federalists and what attitude did Massachusetts take toward them?

How many states have a larger number of good-sized towns? What has the industrial development of the state had to do with this?

What significant fact in the industrial life of the state is indicated in the lines—

> Boats and boats from the fishing banks
> Come home to Gloucester town.

Who was the first secretary of the state board of education, and why do other states owe much to him?

What was the Boston Tea Party? How did it happen that this state was the leader in the opposition to England?

If the United States as a whole had as many inhabitants to the square mile as has Massachusetts, what would its population be?

What is there interesting about the division of the inhabitants according to birth and parentage?

What distinction has this state with reference to education?

How do its native-born inhabitants rank as regards illiteracy?

What was there inconsistent about the attitude of the early inhabitants of the colony toward religion?

How many states have a smaller area than Massachusetts? How many have a smaller population? How many have a greater density of population?

How did an American humorist express his impression of the climate of New England?

What has been done within the last decade to bring Boston into closer touch with ports to the south of it?

What were the two colonies that grew up in Massachusetts called, and when were they united?

How could you tell, by looking at a map of Massachusetts which showed the cities, where the falls in the rivers occur?

mouth, for with its determined insistence upon political freedom there was combined a religious intolerance which seems strange when the reason of the colonists for leaving England is taken into account. It was religious intolerance which led to the banishment of Roger Williams (which see) and Anne Hutchinson (which see), and to the founding of Rhode Island and Connecticut; and the same spirit caused persecution of the Quakers and the hanging of several members of that peaceful body, to say nothing of the bitter persecution of the so-called witches.

But all the troubles of the colony were not internal, for the Indians more than once threatened its safety, and were put down only by persistent warfare.

Later Colonial Days. The struggle with the king over the charter, begun in the early days of the colony's life, continued into the eighteenth century, and was unchecked even when the colonists were lending their aid to the mother country during the French and Indian wars (which see). It was natural, then, that when dissatisfaction with English methods began to crystallize throughout the colonies into open opposition, Massachusetts should have taken a leading part. The first encounters of the Revolutionary War took place on Massachusetts soil, and throughout the war the colony was one of the leaders. In 1780 a state constitution was drawn up, and after the close of the Revolution the new state was one of the first to ratify the Federal Constitution.

Statehood Days. In the early days of the republic Massachusetts was very strongly Anti-Federalist, but by 1797 it had been won to the Federalists, nor did it change its policy until after the dissolution of that party. Very bitter was the opposition toward the War of 1812, but despite that fact the state furnished its full share of men and money, and especially in naval affairs contributed much toward final success.

The constitution of the state prohibited slavery, but such passive disapproval did not content the radicals, and Massachusetts became the birthplace of the abolition movement, the first number of William Lloyd Garrison's *Liberator* appearing in Boston on January 1, 1831. True to its principles, the state furnished nearly 160,000 soldiers to the Union army, built and equipped many vessels and contributed about 30,000 men to the navy.

The history of the state since the War of Secession has been one of steady growth. Resources have been developed, and advanced legislation on various subjects has been enacted. Labor questions, because of the multiplicity of industries, have been constantly to the fore, and more than once have been settled only after strikes and rioting have caused great distress. Politically, Massachusetts voted Republican on national questions from the close of the War of Secession until 1912, when Woodrow Wilson carried the state by a moderate majority. In 1916 President Wilson failed to carry the state; it gave its vote to the Republican candidate. A.MC C.

Consult Bacon's *Historic Pilgrimages in New England;* Drake's *On Plymouth Rock;* Hale's *Story of Massachusetts.*

Related Subjects. The following articles will be of interest in connection with a study of Massachusetts:

CITIES AND TOWNS

Adams
Amesbury
Arlington
Attleboro
Beverly
Boston
Brockton
Brookline
Cambridge
Chelsea
Chicopee
Clinton
Danvers
Dedham
Easthampton
Everett
Fall River
Fitchburg
Framingham
Gardner
Gloucester
Greenfield
Haverhill
Holyoke
Lawrence
Leominster
Lowell
Lynn
Malden
Marlboro
Medford
Melrose
Methuen
Milford
Natick
New Bedford
Newburyport
Newton
North Adams
Northampton
North Attleboro
Northbridge
Peabody
Pittsfield
Plymouth
Quincy
Revere
Salem
Saugus
Somerville
Southbridge
Springfield
Taunton
Wakefield
Waltham
Watertown
Webster
Westfield
West Springfield
Weymouth
Winchester
Winthrop
Woburn
Worcester

EDUCATION

Amherst College
Boston University
Clark University
Harvard University
Massachusetts Institute of Technology
Radcliffe College
Smith College
Tufts College
Wellesley College
Williams College

HISTORY

Boston Massacre
Boston Tea Party
King Philip
Mayflower
Pilgrims
Plymouth Colony
Stamp Act
Witchcraft

LEADING PRODUCTS

Boots and Shoes	Fish
Cod	Granite
Cranberry	Mackerel
Emery	Tobacco

RIVERS

Connecticut	Merrimac
Housatonic	

UNCLASSIFIED

Berkshire Hills	Old South Meeting House
Holyoke, Mount	Plymouth Rock

MASSACHUSETTS BAY COLONY, a colony founded in 1628 at Salem, Mass., by a group of English Puritans who wished religious freedom for themselves. These emigrants, under the leadership of John Endicott, landed in America at a point which they named Salem, after one of the Biblical names for Jerusalem, and governed themselves for a time independent of the king. With the idea that freedom in worship was for themselves only, and not for newcomers, they opposed believers in other faiths, particularly the Quakers (see QUAKERS; also WITCHCRAFT), and defied the king's authority; in consequence, their charter was revoked in 1684. Because of the severity of their restrictions many of their members left the colony to found new homes a little farther inland, and thus Rhode Island and Connecticut received their first settlers.

A new charter was granted in 1691, under which they were governed up to the time of the Revolution. Harvard, the first college for higher education in America, was established in this colony, as was also the free system of public school instruction. See PURITANS; MASSACHUSETTS, subhead *History.*

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *tek nol' o ji,* one of the strongest scientific and technical schools in America, the first institution in the United States to use laboratory methods of instruction. Four-year courses are offered in civil, mechanical, mining and metallurgical, electrical, chemical and sanitary engineering; architecture, chemistry, biology and public health, physics, general science, geology and geodesy, naval architecture and marine engineering, and electrochemistry. There are opportunities for research work in all departments, with specially-equipped laboratories in physical chemistry, applied chemistry and public health. All undergraduate courses lead to the degree of Bachelor of Science. The degrees of Master of Science, Doctor of Philosophy and Doctor of Engineering are given for postgraduate work.

The institute is the land-grant "mechanical college" of Massachusetts. It receives a yearly state appropriation, in return for which it maintains eighty free scholarships. The tuition is $250 per year, except in one course, naval construction, for which it is $500. The institute was incorporated in 1861, largely through the efforts of William Barton Rogers, the first president, but owing to the War of Secession, students were not admitted until 1865. Among the first faculty of ten was Professor Charles William Eliot, later president of Harvard University. Until June, 1916, the school was located in the Back Bay district of Boston; it now occupies a magnificent group of new buildings on the Cambridge side of the Charles River.

In 1914 an agreement was made by the institute and Harvard University whereby the university courses in engineering are given in the buildings of the institute under the supervision of the institute president and a faculty consisting of university and institute professors. Under specified conditions students registered in either institution may attend courses in and receive degrees from the other. Harvard University also transferred to the institute a fund of approximately $15,000,000 which had been bequeathed to Harvard as an endowment for a graduate school of applied science. The school is coeducational, but the courses offered do not attract many women. The institute maintains three publications, the *Technology Quarterly, Proceedings of the Society of Arts* and the *Technology Review.* The library, which is supplemented by that of Harvard and other Boston libraries, contains 120,000 volumes. There are about 300 instructors and 1,900 students.

MASSAGE, *ma sahzh',* a method of medical treatment performed by stroking, friction, kneading or striking the affected parts. It is known to savage as well as to civilized races, and in the Orient, Egyptians, Turks, Japanese and Chinese have employed this manual treatment of the body. It is sometimes confounded with the Swedish movement cure, but the latter requires the active coöperation of the patient to produce results. Massage is used with good results to soothe the nerves, to strengthen the digestive organs and to remove a variety of disordered conditions by pressing out waste material and stimulating circulation. The operator, who performs with his bare hands upon the skin, should be carefully trained and have sufficient knowledge of the

human system to be able to locate muscles and nerves with the fingers and follow them in the right course. Stroking back and forth as fancy suggests will not bring results.

Massage has long been employed to promote physical and facial beauty; the Greeks and Romans considered it one of their luxuries. Facial massage is extensively used at the present time to remove the traces of time. A male operator is called a *masseur,* a female a *masseuse.* W.A.E.

MASSASOIT, *mas a soit'* (1580-1661), chief of the Wampanoag Indian tribe, whose territory before white men reached New England embraced the southern part of what is now Massachusetts. He made a treaty with the Pilgrims soon after their landing in Plymouth, promising never to allow his people to harm the colonists as long as he lived, and for fifty years the treaty was faithfully kept. In turn the Indians were guaranteed protection. On the first Thanksgiving Day of the colonists, Massasoit and a number of his braves were invited to partake of the feast, and afterward he solemnly said, "The Great Spirit surely must love his white children best." His son Philip became the head of the tribe after his death. See KING PHILIP.

MASSENET, *maa s' neh',* JULES ÉMILE FREDERIC (1842-1912), a French composer of operas and songs, born in Montaud. After studying at the Paris Conservatory he became one of its professors in 1878. He composed a great many operas, of which the best known are *Werther, The Cid, Le Jongleur de Notre Dame, Manon Lescaut, Herodias, Don César de Bazan* and *Thaïs.* Massenet developed graceful and imaginative expression in the instrumentation of his operas, and in *Manon,* particularly, he displayed his gift for creating charming, fluent melody. The famed *Meditation,* played between two acts in the opera *Thaïs,* is intended to typify, in its sensuous color, the soul of the voluptuous Thaïs, which is being purged of wickedness. The latter opera was first produced in Paris in 1894, and owes a great deal of its fame to Mary Garden's interpretation of the principal rôle.

MASSILLON, *mas'i lon,* OHIO, a city in Stark County, eight miles west of Canton, the county seat, and fifty-eight miles south and east of Cleveland. It is on the Tuscarawas River and the Ohio Canal, and on the Baltimore & Ohio, the Pennsylvania and the Wheeling & Lake Erie railroads. Electric roads connect it with near-by cities. The area is four square miles. The population in 1910 was 13,879; in 1916 it was 15,310 (Federal estimate).

The city is the seat of a state hospital, a large institution occupying forty buildings, the first state institute for the insane to conduct a school for education and mental training. Prominent public buildings are the Federal building, erected in 1914 at a cost of $100,000, a city hall, a hospital, a theater and a public library.

The city is in a hilly country which contains rich deposits of coal, white sandstone, potter's clay and iron ore. The industrial enterprises of the city are many and varied; among these are steel mills, aluminum plants, flour and feed mills and agricultural implement works; there are also manufactures of stationary and portable engines, structural steel and iron bridges, stoves and heating furnaces, silos and fire and paving brick. The city has a large trade in wheat.

Massillon was founded in 1825, incorporated as a village in 1853 and chartered as a city in 1868. A.H.

MAS'TERS, EDGAR LEE (1868-), an American lawyer and writer whose name became widely known in 1915, upon the publication of his *Spoon River Anthology.* This book, one of the literary sensations of the period, is a poetic volume, written not in the regular verse forms in which Masters had worked hitherto, but in free verse, which is far better adapted to the very unusual content of the poems. Each short poem is an absolutely frank post-mortem statement by some dweller in the rural cemetery of Spoon River. If every headstone could tell the exact, unvarnished truth, without fear or favor, then a collection of the epitaphs in any graveyard would make just such a book as that of Masters—only, as one critic has said, Masters has viewed his characters with the eye of a criminal lawyer, and there is indeed a lack of "sweetness and light." Remarkable character delineation, the ability to tell much in few words, humor, and here and there a touch of real tenderness, make the book noteworthy.

Masters, who was born at Garnett, Kan., and studied at Knox College, Illinois, was admitted to the bar in 1891, and has since practiced law in Chicago. Before *The Spoon River Anthology* appeared he had published *A Book of Verses, The New Star Chamber* and plays entitled *Maximilian, Althea* and *The Trifler.*

MAS'TERSING'ERS (German, *Meistersinger*), societies or guilds of singers, popular in Germany from the fourteenth to the sixteenth centuries. The old Minnesingers had strolled through the country singing verses of chivalrous knights and fair ladies. The Mastersingers were organized in the more important towns, such as Mainz, Strassburg and Nuremberg, by the German burghers who wanted to entertain themselves in the long winter evenings by singing the songs of the old minstrels. Gradually they began to compose their own songs, their simple verses being written upon the subjects taken from Bible stories. Charles IV gave them a charter and a coat of arms. Hans Sachs, the shoemaker of Nuremburg, was the greatest poet among them (see SACHS, HANS). Singing contests were held, the prize consisting sometimes of money and sometimes of a wreath of flowers. The organization resulted in the laying down of tedious rules and formulas, to which the tunes and verses must conform, which made them stupid and often absurd, and after the sixteenth century the Mastersingers gradually disappeared. The last society survived at Ulm until 1839. The customs of the Mastersingers are picturesquely treated in Richard Wagner's music drama, *The Mastersingers of Nuremberg.*

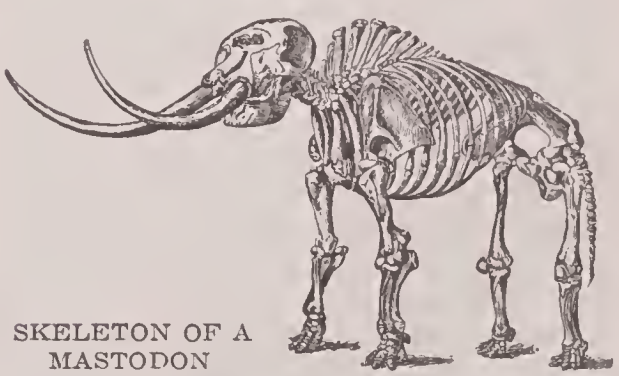
MASTICATION, *mas ti ka'shun,* the first step in the process of digestion. It takes place through the grinding action of the teeth and the mixing of the food with saliva. The term is derived from a Latin word meaning *to chew.* The food, however, is not only chewed by the teeth into small pieces and reduced to a pasty mass by the saliva, which is the mechanical part of the process, but it undergoes some chemical change. That is, the saliva contains a ferment called ptyalin, which has the power of turning the starch in the food into sugar. As starch dissolves very slowly in water and sugar dissolves very rapidly, the chemical action of the saliva plays a part in beginning the digestive process. Meat and eggs, which contain no starch, need comparatively less chewing than such starchy foods as crackers and bread, but all foods should be chewed well. "Bolting" the food, that is, eating so hastily that large, hard lumps pass into the stomach, causes the digestive organs to overwork, and the result is indigestion. Persistence in this habit may lead to chronic dyspepsia. See FLETCHERIZING; DIGESTION. W.A.E.

MASTIFF, *mas'tif,* one of the oldest families of dogs, belonging to the hound breed. It is the largest and most muscular dog known, and is prized for its courage and power, inherited from bulldog ancestors, and for its ability to watch and guard premises and persons, the latter a strongly-marked instinct. It

THE MASTIFF

is a noble-looking animal, with a strong, massive head, hanging ears and deep, overlapping lips. The coat is short, of a light or dark fawn color, except the ears, muzzle and nose, which are black. The height of the shoulders is from twenty-five to thirty inches. Despite its savage appearance, the mastiff is gentle and docile, and makes a desirable pet for children.

MASTODON, *mas'toh don,* the name of a group of extinct animals belonging to the elephant family. The fossil remains of several species which have been excavated in Europe, Asia and America show that they existed in



SKELETON OF A MASTODON

those geologic ages known as Miocene, Pliocene and Pleistocene (see GEOLOGY). The best-known species, mounted specimens of which may be seen in museums in many large cities, roamed in great numbers over the United States and Southern Canada. This mastodon resembled the present elephant in general form and appearance, but its legs were probably shorter. The name, which comes from two Greek words meaning *breast* and *tooth,* refers to the peculiar structure of the molar teeth,

which terminated in irregular nipple-shaped projections.

MATABELE, *ma ta be'le,* meaning *hidden people,* is the name applied to a Kafir tribe who were once accustomed to appear in battle hidden by large oxhide shields. They are of Zulu stock, and their home is in Matabeleland, which now belongs to the British colony of Rhodesia in South Africa. It lies between the Limpopo and Zambezi rivers, and is north of the Transvaal. When the Boers drove the Matabeles out of the Transvaal in 1837, Mosilikatze, their chief, gathered a military host collected from every tribe which he had conquered during his ten-years' sway in the Transvaal, crossed the Limpopo and established a military tyranny in the new territory. Since the conquest of Matabeleland by the British in 1893, the Matabeles have abandoned their practice of constant warfare for the peaceful life of the farmer and herdsman.

MATAN'ZAS, the capital of the province of Matanzas, Cuba, next in importance to Havana as a railroad and commercial center. Its export of sugar alone averages $15,000,000 annually. It is situated on Matanzas Bay, one of the largest and best of Cuba's harbors, about fifty-two miles east of Havana, with which it is connected by rail. The cave of Bellamar, noted for its great stalactites, and the cave of Yumuri Valley, in the vicinity, attract many visitors. The city was fired upon, but without damage, by the American fleet during the Spanish-American War. Population, 1910, 64,385. See STALACTITE AND STALAGMITE.

MATCHES. Scientists state that when primitive man learned how to produce fire he made the first practical invention, and that this discovery marked his emergence from the lowest state of savagery. Looking down the centuries of human history we see at one end of the inventive chain two pieces of dry wood that the savage rubbed together to produce the precious flame; at the other end is the modern match, an object in such common use it seems always to have been with us. Many ages elapsed, however, before the familiar splint of wood, tipped with an inflammable head, was devised. From rubbing bits of wood together man passed to the production of fire by means of a piece of flint, a steel and a bit of cloth for tinder, and then progressed by slow degrees to less cumbersome methods.

It was not until the beginning of the nineteenth century that any device similar to a match in the modern sense came into general use. For domestic and other purposes it was customary to obtain fire by means of a flint and steel, a tinder-box and splints of wood tipped with sulphur. The tinder consisted of fragments of carbonized linen and cotton, treated to a high temperature in a closed vessel. The sparks produced by striking the steel on the flint fell into the tinder, set the mass in a glow, and developed enough heat to set fire to the sulphur tips of the splints. These splints were known as "brimstone matches" and "spunks." In the year 1805 a French scientist devised an apparatus consisting of a small bottle containing asbestos saturated with sulphuric acid, together with splints coated with sulphur and tipped with a mixture of sugar and chlorate of potash. Fire was produced by chemical action; the match heads ignited when brought in contact with the substance in the bottle.

Friction Matches. The device described above, known as the *instantaneous light box,* was both dangerous and inconvenient, and was superseded by the *friction match,* said to be the invention of John Walker, an English druggist. The friction match was introduced in the year 1827, and its invention marks the beginning of the modern industry. Walker's match consisted of a wooden splint or stick of cardboard coated with sulphur and tipped with a mixture of chlorate of potash, sulphide of antimony and powdered gum. The match was ignited by being drawn through a piece of bent sandpaper.

The next important step in the development of the match was the invention of the phosphorus friction match, which was brought into general commercial use in 1833. The first of this type made in the United States were manufactured at Springfield, Mass., in 1836. They were of the "strike anywhere variety," and the inflammable head consisted of white or yellow phosphorus, together with sulphur and other substances that yield oxygen readily in the presence of heat, such as chlorate of potash, red lead, nitrate of lead and peroxide of manganese. White or yellow phosphorus is a deadly poison, which is liable to infect operatives who handle it with a distressing disease called "phossy jaw." The terrible suffering endured by workmen in match factories led to an international movement for their protection, and the use of white or yellow phosphorus is now forbidden by law in practically every country engaged in the manufacture of matches. The substance now most widely em-

ployed as a substitute is *sesqui-sulphide of phosphorus,* a harmless ingredient which is quite as satisfactory as the white phosphorus. Red phosphorus has also found favor as a substitute.

Safety Matches. A match known as a safety match was the invention of a Swedish manufacturer named Lundstrom; this has been on the market since 1855. As its name implies, this match can be ignited only by being rubbed on a specially-prepared surface. Its head contains no phosphorus, but holds a mixture of which chlorate of potash usually forms a part. The striking surface, which is on the side of the box, is formed by a compound of red phosphorus and sand. The manufacture of safety matches is confined largely to Sweden and Norway.

How Matches Are Made. In the match industry the best grade of lumber is used. The ordinary match is made from two-inch planks of white pine, from which all knots and cross-grained portions have been removed. The wood is sawed into blocks the length of a match, that is, from one and seven-eights to two and one-half inches, and the blocks are then run through a machine which cuts them into rows of splints, each row containing splints for forty-four matches. As each row of splints is cut from the block it is placed in a machine consisting of cast-iron plates formed into an endless chain by link attachments. This machine, revolving from 175 to 250 times a minute, cuts forty-four matches at each revolution. When the splints have been cut they are carried from the cutting end of the machine by the endless chain attachment over a block which heats the ends, then to a receptacle containing melted paraffin, and finally to one containing the substance of which the heads are made.

The match tips are heated so the paraffin will not become chilled as it comes in contact with them, and the receptacles containing paraffin and the composition which forms the head are automatically replenished without any interruption of the work of the machine. The bundles of matches are finally cooled by blasts of cold, dry air and are automatically deposited in boxes. A machine of this type will turn out one hundred gross of boxes a day, and requires the attention of eight girls. These boxes are fed into the machine automatically, and when filled they are deposited on a rotating table. There a number of girls place covers on them and pack them into cases, and the operation is completed. Two million matches can be produced in one day by machinery requiring the services of only seventy-five operatives. M.R.T.

MATÉ, *mah'ta,* or **PARAGUAY,** *pair'a gway,* **TEA,** a South American holly, whose leaves and shoots are used, when dried and roughly ground, for making tea. The term *maté* was applied originally to the vessels in which the drink was steeped. These vessels were made of gourds, or calabashes. The tea is made by pouring boiling water over the dried leaves and stems. It has the same stimulating effect as ordinary tea on account of the presence of a large proportion of *caffein,* which is also found in tea and coffee.

Maté is a shrub or small tree with wedge-shaped leaves and small flowers in the axils of the leaves. Maté raising is an extensive industry in Paraguay and Brazil, over 5,000,000 pounds of the dried leaves being exported annually from Paraguay alone. See HOLLY.

MATE, a corruption of an old English word *gemaca,* means a comrade or companion. In merchant vessels a mate is one of the assistants of the captain, or master. The *first mate* is always second in command, except on ocean passenger steamers, where great division of authority is necessary. In warships the mates are not assistants to captain or other officers, but serve under the gunners, carpenters and boatswains and have specified duties. According to the position they occupy they are called carpenter's mate, gunner's mate, boatswain's mate, etc.

MATERIALISM, *ma te'ri al iz'm,* a system of philosophy which teaches that matter is the only thing in the universe that has reality, and which denies the existence of mind or soul as distinct from matter. All mental processes are regarded as the result of physical changes in the nervous system, and thoughts, will and feelings are said to have no real existence. The word comes from the Latin *materia,* meaning *matter;* the theory of materialism dates back to a period before Socrates, over 400 years before Christ. In a modified form the principles of materialism have been upheld by such eminent English philosophers as John Locke, John Stuart Mill, Thomas Hobbes and Herbert Spencer, but the opposite system, idealism, is more in favor.

In a popular sense materialism is applied to the tendency to attach greater value to the things of the material world rather than to the mind and spirit.

MATE'RIA MED'ICA, a Latin phrase meaning the *materials of medicine,* is the division of medical science which relates to the materials used in the cure, alleviation or prevention of disease. The materials are classified according to physical properties, method of preparation, composition, their action as curative agents, etc. *See* MEDICINE AND DRUGS.

MATHEMATICS, *math e mat'iks.* To the child in the elementary school mathematics means arithmetic, processes of addition and subtraction; to the high school pupil the conception widens and takes in algebra and, later, geometry; while to the student who pursues the subject further the term takes on an even broader meaning. But in all these branches, no matter how they may differ in subject-matter and in methods, there is a similarity—they are all sciences which deal with magnitude, quantities and numbers, and their relations. That is about as good a definition as can be given of mathematics, for while some of the greatest scientists and philosophers have attempted to define the term, no one has ever succeeded to the satisfaction of all.

All mathematical conceptions—that is, all conceptions or ideas which can be definitely described in terms of numbers—are within the scope of mathematics; and even the person who could not define a mathematical conception, or perhaps has never even heard the name, can tell whether or not any notion does come within the range of mathematics. It is clear, for instance, that sugar, regarded as the chief ingredient of candy, is not a mathematical conception; when only its bulk, its weight and its price are considered it is such a notion. A book may contain the wisdom of the ages, or all the beauties of poetry, and thus lie quite outside the scope of mathematics, but in so far as it is a rectangular solid with a definite length, breadth and thickness, it is a mathematical conception.

The Great Branches. Mathematics is not just one science, but a great group, joined together by similarity in subject matter and treatment. As generally considered, it is divided into three great departments, but these are so closely related, so interwoven with each other, that no hard and fast distinctions are possible. The departments are:

(1) *Arithmetic,* which deals with the nature and properties of numbers, and with operations performed by means of them. This branch also includes algebra in so far as the latter science is but generalized arithmetic, expressing the same facts in symbols instead of figures;

(2) *Analysis,* which includes some of the more abstruse and theoretical phases of algebra, as differential equations, but has as its main branch calculus;

(3) *Geometry,* which treats of the measurement and properties of lines, angles, surfaces and solids. One branch of this subject, analytical geometry, is included by some authorities under analysis. Trigonometry is a higher phase of geometry.

Pure and Applied Mathematics. Anyone who has studied geography or physics or astronomy knows that from time to time he has much use for mathematics. He knows, too, that he uses numbers not as abstract things with no especial connection with the concrete affairs of life, but as a means of finding out certain very definite facts. This phase of mathematics, which considers theories and principles only as they are related to the material world, is known as *applied* mathematics, and it is opposed to *pure* mathematics, which treats of theories and principles for their own sake. The student who masters the multiplication table is studying pure mathematics; it makes no difference to him whether grains of sand or solar systems are under consideration—two times six makes twelve in either case.

Pure mathematics lies at the basis of applied mathematics, but this does not mean that the latter is of minor importance. In studying such practical subjects as heat and optics and electricity, applied mathematics is of the greatest service, and many of the discoveries of science could never have been made without its help. An illustration of this fact will be interesting. The planet Uranus, over a billion and a half miles from the sun, was believed by astronomers to be the outermost member of the solar system, and all its movements were carefully charted. But observation showed that at times it behaved very strangely, apparently wandering out of its path, and astronomers decided that only the attraction of another planet, far beyond it, could thus pull it from its course. Accordingly they set to work, and by means of mathematical formulas figured out where the new planet ought to be. Then when all was ready, they examined the heavens through their strongest lenses, and there was the planet just where they had calculated it must be, and they named it Neptune. The telescope alone might never have discovered this planet.

Story of Mathematics. As long ago as 3000 B.C. the Egyptians knew a great deal about mathematics. Many of their methods, to be sure, were cumbersome, but arithmetic, algebra and geometry were all understood to some extent. The Babylonians, too, knew something of the science, of which they made use in their studies in astronomy. But only with the Greeks was the real science of mathematics developed. Though they worked out to a certain extent a theory of numbers, it was in geometry that they were chiefly interested, and some of their great geometers left little to be discovered in certain phases of that subject (see GEOMETRY). It seems strange that the practical Romans should have made so little contribution to the subject, but not so strange that the theorizing, mystical scholars of the Middle Ages should have neglected it.

Meanwhile, however, the Oriental nations had taken up mathematics, and the Hindus and Arabs developed to a creditable degree arithmetic, algebra, geometry and even astronomy. It is not fair to give, as is usually done, the credit for the modern system of numbers to the Arabs, for the Hindus invented it, and the Arabs merely borrowed it. Interesting to note is the fact that the Persian Omar Khayyam, whose *Rubaiyat* is world-famous, was not only a poet but an authority on algebra. The results of much of this Oriental study and discovery were carried by the Arabs to Spain, and thus Europe was roused to a new interest in mathematics.

The Renaissance (which see) gave new birth to mathematics, and from that time onward development was fairly rapid. Descartes, who lived in the seventeenth century, gave a great impetus to the science, helping particularly to make elementary algebra what it is to-day. Other great names in the history of mathematics are those of Kepler, whose contributions to geometry were epoch making; and of Newton and Leibnitz, who practically remade higher mathematics by their discovery of the principles of calculus.

The work of these masters left little to be done in regard to the fundamental theories and principles, but the later centuries have been by no means idle. They have evolved a multitude of new methods and new applications, some very difficult and abstruse, and beyond the reach of any but scholars, others which have as their object the simplifying and illuminating of the lower branches. All in all, it may be said that the constant tendency is to make mathematics as studied in the schools more practical; to give problems which are not mere abstractions but have a relation to the life of the pupils. Many of the theories and reasonings which used to be looked upon as an integral part of the subject are now taught only to those students who expect to do advanced work in mathematics, and elementary pupils are not compelled to study principles which they cannot possibly use in their later life.

Mathematics is universally taught in the schools. The articles in these volumes on the various branches discuss the value, both practical and disciplinary, of the subject in all its departments. A.MC C.

Related Subjects. The reader who is interested in mathematics is referred for wider and more detailed treatment to the following articles in these volumes. Some of these also contain extensive indexes, so that the list referred to is a wide one.

Algebra	Geometry
Arithmetic	Mensuration
Calculus	Trigonometry

The lives of the following eminent mathematicians are also treated in these volumes:

Archimedes	Napier, John
Descartes, René	Newton, Sir Isaac
Dodgson, Charles L.	Omar Khayyam
Euclid	Plato
Kepler, Johann	Ptolemy
Laplace, Pierre Simon	Pythagoras
Legendre, Adrien M.	
Leibnitz, Gottfried Wilhelm	

MATH'ER, the family name of two very notable clergymen, father and son, of colonial times in America.

Increase Mather (1639-1723) was born in Dorchester, Mass. His unusual name was bestowed upon him "because of the never-to-be-forgotten increase of every sort wherewith God favored the country about the time of his nativity." He was a precocious boy, for he was graduated from Harvard at the age of seventeen, after which he went to Dublin for further study. Certain sermons which he delivered in England were favorably received, and at the time of the Restoration he was urged to settle there, but he returned to Massachusetts and in 1664 was made pastor of the North Church of Boston. His influence was great on State as well as Church questions, and in 1688 he was sent to England to regain the colonial charter which had been revoked by Charles II. He failed to do that, but accepted from William II a new charter which was in most respects satisfactory. It was while he was in England that

the Salem witchcraft panic occurred, and he had no active part in it.

Meanwhile, in 1681, he had been appointed president of Harvard College, but had resigned because his church would not release him. Four years later he accepted a similar appointment on condition that he might live in Boston and continue a fairly close relation with his parish. He held the position until 1701, when the general court of Massachusetts passed an act requiring Harvard's president to live in Cambridge. The act was aimed at Mather, because of enemies he had made. His later years were devoted to his church and contained little that was of general interest. His published works were numerous and include *A Brief History of the War with the Indians in New England, An Essay for the Recording of Illustrious Providences,* a *Discourse Concerning Comets* and *Cases of Conscience Concerning Witchcraft.*

Cotton Mather (1663-1728) was the son of Increase Mather and grandson of John Cotton. He was born in Boston, entered Harvard College at the age of eleven and was graduated with honors when but fifteen. The attention which his precocity drew upon him resulted in making him vain, and from these faults he never entirely recovered. In 1680 he became his father's assistant in the North Church, Boston, though it was not until five years later that he was ordained pastor. While still a young man he became one of the most influential figures in the colony, but his genuine zeal and scholarship have been so overshadowed by his connection with the witchcraft movement, while his father was in England, that they are frequently overlooked. He was not alone among eminent and scholarly men in his belief in witchcraft, but he was more active than most in stirring up the crusade against it. He wrote *Memorable Providences Relating to Witchcraft and Possessions* and *Wonders of the Invisible World;* he investigated cases for himself, always with a strong prejudice against the accused, and counseled the magistrates to proceed with vigor in rooting out the supposed evil.

After the witchcraft excitement had abated, Cotton Mather's influence decreased somewhat. Like his father, he was an earnest conservative and vigorously opposed the introduction of new ideas, especially in Harvard College, of which his father was president for seventeen years. He himself hoped to attain the presidency, but was more than once disappointed. His greatest work, the *Magnalia Christi Americana,* or *Ecclesiastical History of New England,* while full of the prejudices of its author, is a valuable document to students of colonial history. He also wrote *Essays to Do Good,* which are yet sometimes widely read, and a curious life of his father, called *Parentator.* A.MC C.

See, also, MASSACHUSETTS BAY COLONY. Consult Pond's *The Mather Family;* Walker's *Ten New England Leaders.*

MATTEAWAN, *mat a wahn',* N. Y., the former name of BEACON, N. Y. (which see).

MATTER. According to a principle of physical science, anything that occupies space is said to be *matter.* This definition takes no account of the size, shape or substance of any portion of matter, for the term includes the air we breathe and the water we drink, the objects of furniture in a room and the materials of which the house itself is made. The various measurements with which we are familiar are based on the fact that every portion of matter has three dimensions—length, breadth and thickness. In regard to structure, matter is believed to be made up of very small particles called *molecules.* When subjected to chemical action these units are separated into *atoms* (see MOLECULE; ATOM; ATOMIC THEORY). The relation of the molecules to each other determines the *state of matter,* whether it is solid, liquid or gaseous.

Properties of Matter. There are certain characteristics or properties of matter, some of which are common to all forms, and some of which are possessed only by certain kinds. The more important of these properties are hardness, extension, porosity, elasticity, gravitation, cohesion, adhesion, tenacity, malleability and ductility. Each one named is described in these volumes under its proper heading. C.R.M.

MATTERHORN, *mat'er horn,* the German name for a famous peak in the Pennine Alps,

THE MATTERHORN

on the boundary between the canton of Valais, Switzerland, and Piedmont, Italy, about forty miles from Mont Blanc. This mighty peak,

which rises like a giant sentinel from the giant masses about it, and whose upper slopes are covered with eternal snows, is one of the most superb mountains of the world. A great many daring travelers have attempted to reach its summit, 14,782 feet above the sea, but it was not until 1865 that the ascent was accomplished. In that year a party led by Edward Whymper, a British mountaineer, climbed to its top, but in descending four of the party fell over a precipice and were killed. Since then the Matterhorn has been scaled repeatedly.

MATTHEW, SAINT, one of the Twelve Apostles, accepted as the author of the first book of the New Testament, the *Gospel According to Saint Matthew.* According to his own statement, he was a publican, or tax-gatherer, and was called to be a follower of Jesus, as he sat in his place of business. Mark and Luke call him Levi, and speak of him as the son of Alphaeus, thus making him possibly the brother of another Apostle, James, the son of Alphaeus. Nothing further is recorded of him in the Gospels save that he gave a feast in honor of Jesus, to which he invited other publicans. The *Acts of the Apostles* mentions him once, and later non-Scriptural accounts declare that after preaching for some years in Jerusalem he visited other countries as an evangelist. Most of the early legends agree that he died a natural death, but there are some which declare that he suffered martyrdom in Ethiopia, now known as Abyssinia.

MATTHEWS, [JAMES] BRANDER (1852-), an American educator and man of letters, was born in New Orleans. After graduating from Columbia College he studied law, but soon turned from that profession to literature. His works have been varied, including stories, comedies, essays on subjects connected with the drama, and studies in literature. *An Introduction to the Study of American Literature* is one of his best-known works. Among the others are *Americanisms and Briticisms, Vignettes of Manhattan, French Dramatists of the Nineteenth Century;* the comedies, *Margery's Lovers* and *In the Vestibule Limited,* and the novel, *His Father's Son.* Matthews helped to found the American Copyright League, and took an active part in the simplified spelling movement.

MATTOON, *ma toon',* ILL., a manufacturing city in Coles County, with a population of 11,456 in 1910, which increased to 12,582 (Federal estimate) in 1916. It is situated southwest of the geographical center of the state, 128 miles west of Indianapolis, 133 miles northeast of Saint Louis and 172 miles southwest of Chicago. The city is served by the Cleveland, Cincinnati, Chicago & Saint Louis and Illinois Central railways; an electric line extends east to Charleston, Ill. In 1855 the city was settled and incorporated. The area is four square miles.

Mattoon is located in an agricultural district which produces grain, live stock, fruit and broom corn, the yield of the last-named being extensive. Among the leading industrial plants are broom factories, flour mills, grain elevators, wagon and carriage factories, tile factories and foundries. In addition to these there are the repair shops of the two railroads operating through the city. The prominent buildings are a $90,000 Federal building, an Old Folks' Home (I. O. O. F.) and a Carnegie Library.

On May 26, 1917, a tornado visited the city, destroying a section five blocks wide, killing fifty-seven people, injuring several hundred, and rendering over 2,000 homeless.

MAUNA KEA, *mau'nah kay'ah,* a burnt-out volcano of Hawaii, the highest peak on the Pacific islands. It is 13,823 feet above the sea, and during most of the year the top is white with snow. From this feature it receives its name of Mauna Kea, the Hawaiian expression for *white mountain.* From a distance Mauna Kea looks like a huge mound, whose slopes, except near the top, are green with coffee and cane plantations. The upper portion is a desolate waste of reddish ashes and lava rock, with snowdrifts in the crevices and sheltered places.

MAUNA LOA, *mau'nah lo'ah,* "Great Mountain," the world's largest volcano, situated on the island of Hawaii. The volcano is 13,675 feet high; its enormous crater, a mile and a half in diameter, contains a lake of liquid fire, and its smoke rises like a cloud both by day and night. Ordinarily 400 feet below the top of the crater, the liquid lake sometimes rises to within fifty feet of the top. The natives formerly stood in great fear of the volcano, believing that a raging goddess named Pele dwelt in the fire and that, if offended, she would "shake with her thunders and shatter her island." Mauna Loa bursts into activity about once every ten years. Since 1916 it has been a part of the Hawaii National Park. See VOLCANO.

MAUNDY, *mawn'di,* THURSDAY, commonly known as HOLY THURSDAY, the Thursday preceding Easter Sunday. It is celebrated in commemoration of the Last Supper and the washing of the Disciples' feet by Jesus. In England and other countries, it was formerly the custom for the sovereign on this day to

wash the feet of twelve poor persons and bestow gifts upon them. The custom of washing the feet still exists among Roman Catholics, the bishops or priests washing the feet of twelve altar boys. In Rome, the Pope on this day washes the feet of twelve bishops. G.W.M.

MAUPASSANT, *mo pa sahN',* Henri René Albert Guy de (1850-1893), a French writer of fiction, born at Miromesnil Château in Normandy. He was educated at Yvetot and Rouen, France, and when about twenty years of age entered government service in the department of public instruction, but was dissatisfied because of his great interest in literature, especially fiction. In 1880 he contributed to a book of fiction a short story entitled *A Ball of Tallow.* It was a masterpiece, and immediately placed him among the foremost writers of France. During the next year he wrote *The Foolscap House,* a collection of short stories, and critics began to speak of him as the most skilful short-story writer the nation had yet produced.

In 1883 he wrote his first novel, *A Life.* It is a marvelous example of accurate observation, without the least emotion or effort to impress a moral lesson, and yet deeply affecting because of its tone of absolute truthfulness. Except in Hugo, France had never seen such literary art, and Maupassant found himself surrounded by admiring disciples anxious to learn his style.

Between 1883 and 1886 his skill was at its height, and many masterpieces appeared in such collections of stories as *Miss Harriet, Yvette, Stories and Novelettes* and *Tales of the Day and Night.* It was during this period that he wrote *The Necklace,* now generally considered the most perfect short story in any language.

By 1886 Maupassant's best work was completed. A nervous malady and his violent exercise in an effort to cure it had greatly weakened him; he began to show signs of insanity, but continued his writing and displayed more sympathy but less skill in his fiction. In 1891 general paralysis came upon him; early the next year his reason gave way entirely, and on July 6, 1893, he died in a Paris hospital.

MAURITIUS, *maw rish' i us,* a British island in the Indian Ocean, 550 miles east of Madagascar, once known, during a brief period of French dominion, as Ile de France. It was discovered by the Portuguese in 1505, and in 1598 was ceded to the Dutch, who gave the island its present name in honor of Count Maurice of Nassau. Abandoned by the Hollanders in 1710, it was taken over by the French, and in 1814, at the close of the Napoleonic wars, was formally ceded to Great Britain, to whom it now belongs.

Mauritius has an area of 720 square miles, and is therefore three-fifths as large as Rhode Island. Several extinct craters indicate that it is of volcanic origin. It is skirted by coral reefs and diversified by hills and low, rugged mountains of varied and picturesque beauty. A charming description of the island scenery is given by Bernadin de Saint Pierre in his beautiful romance *Paul and Virginia,* the scenes of which are laid in Mauritius. Port Louis, the principal town and the capital of the island, is located on a harbor provided with an inner basin called the *Fanfaron;* here vessels take refuge during the violent hurricanes which frequently sweep over the island.

In 1913 Mauritius had an estimated population of 379,850. Less than one-third of the inhabitants are Europeans, the bulk of the population consisting of native East Indians. There are about sixty government schools, ample telephone and telegraph lines and about 130 miles of railway. A thriving trade is carried on with the United Kingdom, South Africa, Australia, India, France and Madagascar. Sugar is the principal article of export, but molasses, rum, cocoanut oil and vanilla are also shipped away. The chief imports are rice, wheat and other grains, cotton goods, wine, coal and hardware.

MAUSOLEUM, *maw so le' um,* a term applied in modern times to a tomb of considerable architectural pretensions, often taking the form of a burial chapel. The word was derived from the tomb of Mausolus, a king of Caria, near the Aegean Sea. When he died, in 353 B. C., Artemisia, his widow, erected at Halicarnassus one of the most magnificent tombs the world has ever seen. Artemisia died before the tomb was completed, but the work was carried on by the most famous sculptors of ancient times, and became known as one of the wonders of the world.

See Seven Wonders of the World; also the illustration in article Masonry.

MA'VOR, James (1854-), a Canadian economist and educator, generally regarded as the foremost of contemporary Canadians in his field. Professor Mavor is not merely a writer on economic theories, nor a teacher, but a practical investigator whose services have been used by the British and Canadian governments to study numerous economic and social problems, including labor conditions, immigration, copyright, railway rates and grain production.

Professor Mavor was born at Stranraer, Scotland, and received his schooling at Glasgow, where he completed his education at the university. In 1888 he was appointed professor of political economy and statistics in Saint Mungo's College, Glasgow. There he taught for four years, and also found time to act as editor of the *Scottish Art Review,* and as assistant editor of a technical journal, and to take an active part in university-extension work and in numerous schemes for social progress. In 1892 he was appointed one of a committee of four to investigate the operation of labor colonies in Germany, and in the same year was called to Canada as professor of political economy in the University of Toronto. In succeeding years his investigations took him to all parts of the earth, but his work as a teacher has continued to take the larger share of his time.

Professor Mavor is a voluminous writer. Of particular interest to Canadians are the following: *Report to British Board of Trade on the Northwest of Canada; Taxation of Corporations in Canada; Railway Transportation in America; Taxation in Ontario; A Short Economic History of Canada;* and *Government Telephones, The Experience of Manitoba.* Of more general interest are his *Wage Theories and Statistics; An Economic History of Russia;* and a general treatise on *Economics.*

MAX'IM, Sir Hiram (1840-), an American inventor, born in Maine, afterwards becoming a naturalized Englishman, receiving knighthood in 1901. He invented the guns that are known by his name and which are used by nearly every civilized nation. Maxim had a horror of war and hoped his guns would make everybody see how terrible war really is and render conflicts less likely to occur. *Maximite,* invented by him specially for use with the Maxim gun, was patented in England in 1889 and is a mixture of trinitrocellulose, nitroglycerine and castor oil. He also invented an incandescent light and a searchlight. In 1894 he devised a flying machine which met with partial success.

MAXIMILIAN, *mak si mil' yan* (1832-1867), an Archduke of Austria who is remembered chiefly for his brief rule as emperor of Mexico. Maximilian was a brother of Emperor Francis Joseph of Austria (which see). He became commander of the Austrian navy in 1854, and later governor of Lombardy and Venetia. When French troops interfered in the affairs of Mexico and established an empire there (see Mexico, subtitle *Government and History*), Maximilian took the throne under protest, but he immediately tried to regenerate the country. However, he did not understand the people, and his efforts only aroused their hatred; matters were made more hazardous for him by withdrawal, upon the protest of the United States government, of the French troops sent by Napoleon to support the new emperor. Though he made a brave effort to hold his authority, he was betrayed, and after a short confinement was tried by a military court in 1867, convicted of treason, and shot. His extensive writings were published after his death.

MAXIMILIAN I (1459-1519), a Holy Roman emperor, of note chiefly for his success in promoting the fortunes of the House of Hapsburg. He was the son of Frederick III, whom he succeeded in 1493. In 1477 he married Mary, daughter of Charles the Bold, and had thus acquired a claim to Burgundy and the Netherlands. He had to fight for his rights, however, with Louis XI of France, who finally succeeded in wresting from him a portion of the inheritance.

Mary died in 1482; and in the year that he became emperor (1493) he married Bianca, daughter of the Duke of Milan; the alliance brought him long-continued war in Italy but no accession of territory. He caused his son Philip to marry Joanna, daughter of Ferdinand and Isabella of Spain, thus securing that country to the royal house of Austria; and for two of his grandchildren he arranged marriages with the son and daughter of the king of Hungary and Bohemia, and by so doing established a claim on those countries. Though Maximilian placed the interests of his house above those of the empire, he was not neglectful of the latter, and unsuccessfully attemped, in 1495, to allay the constant civil strife which disturbed the empire by the proclamation of a perpetual peace. It was during Maximilian's reign that the Swiss secured their independence from Austria. See Hapsburg, House of.

MAXIMILIAN II (1527-1576), a Holy Roman emperor whose mild rule gave Germany a chance to recover in a measure from the turbulent times through which it had been passing. He was the son of Emperor Ferdinand I, and was brought up among the strictest of Catholic surroundings, but he showed himself favorable to the new religion, and the Protestants hoped for much when he came to power. On his accession to the imperial dignity in 1564, however, he proved himself a man of little spirit, and the Protestants were disappointed in their hopes.

MAY CALENDAR

Birthdays

1. Joseph Addison, 1672.
   George Inness, 1825.
2. Catharine II (Russia), 1729.
   Sir Alexander Tilloch Galt, 1799.
3. Jacob A. Riis, 1849.
4. John Graves Simcoe, 1793.
   Horace Mann, 1796.
5. Hubert Howe Bancroft, 1832.
6. Maximilian Robespierre, 1758.
   Robert E. Peary, 1856.
7. Robert Browning, 1812.
8. Sir Samuel Leonard Tilley, 1818.
9. John Brown, 1800.
10. James G. Bennett, Jr., 1841.
11. Jean Léon Gerome, 1824.
12. William Howe, 1803.
    Robert Baldwin, 1804.
13. Maria Theresa, 1717.
14. Gabriel Daniel Fahrenheit, 1686.
15. Florence Nightingale, 1820.
16. Honoré de Balzac, 1799.
17. Edward Jenner, 1749.
    Alfonso XIII, 1886.
19. John Gottlieb Fichte, 1762.
20. John Stuart Mill, 1806.
21. Albrecht Dürer, 1471.
22. Wilhelm Richard Wagner, 1813.
23. Thomas Hood, 1799.
24. Karl von Linné, 1707.
    Queen Victoria, 1819.
25. Ralph Waldo Emerson, 1803.
    Edward Bulwer-Lytton, 1803.
27. Dante, 1265.
    Nathanael Greene, 1742.
    Julia Ward Howe, 1819.
28. William Pitt, 1759.
    Louis J. R. Agassiz, 1807.
29. Charles II, 1630.
    Patrick Henry, 1736.
31. Walt Whitman, 1819.

Events

1. Legislative union of England and Scotland, 1707.
   Battle of Manila Bay, 1898.
2. Hudson's Bay Company chartered, 1670.
   "Stonewall" Jackson wounded at Chancellorsville, 1863.
3. Jamaica discovered, 1494.
4. Napoleon arrived at Elba, 1814.
5. Historic meeting of States-General, 1789.
6. Secession of Arkansas and Virginia, 1861.
7. *Lusitania* sunk by German submarine, 1915.
8. Charles II proclaimed king, 1660.
9. Accession of George V proclaimed, 1910.
10. Ticonderoga captured by Ethan Allen, 1775.
    Death of "Stonewall" Jackson, 1863.
11. Minnesota became a state, 1858.
12. Charleston, S. C., captured by British, 1780.
13. Confederacy recognized by Great Britain as belligerents, 1861.
14. Henry IV of France assassinated, 1610.
15. The *Alabama* launched at Birkenhead, England, 1862.
    Louis Riel surrendered, 1885.
16. Memorial to Queen Victoria unveiled in London, 1911.
18. Great fire in Montreal, 1765.
    Lincoln nominated, 1860.
19. Treaty between United States and Mexico, 1848.
20. Secession of North Carolina, 1861.
    Sir John A. Macdonald became Premier of Canada, 1862.
21. Panama Canal voted by House free of toll to American coastwise vessels, 1912.
22. Kansas-Nebraska Bill passed by House, 1854.
23. Italy declared war on Austria, 1915.
24. Empire Day first observed in Great Britain as memorial to Queen Victoria, 1904.
25. Constitutional Convention began its work, 1787.
26. Rebel Canadian Indian chiefs surrendered, 1885.
27. Robert Bruce crowned king of Scotland, 1306.
28. Spanish Armada left Lisbon, 1588.
29. Jacques Cartier sailed to colonize Canada, 1535.
    Wisconsin became a state, 1848.
30. Joan of Arc put to death, 1431.
31. The Johnstown flood, 1889.
    Great naval battle off Danish coast, 1916.

For Study

Bean
Bee
Bird
Cat
Codling Moth
Fly
Grafting
Insect pests
Leaf
May Beetle
Migration of Birds
Poultry
Scarlet Tanager
Stems
Strawberry
Trillium
Violet
Weeds

MAY QUOTATIONS

1. The spacious firmament on high,
With all the blue ethereal sky,
And spangled heavens, a shining frame,
Their great Original proclaim.
—*Addison.*

2. The Spring is here—the delicate footed May,
With its slight fingers full of leaves and flowers,
And with it comes a thirst to be away,
In lovelier scenes to pass these sweeter hours. —*Willis.*

3. There's no dearth of kindness
In this world of ours;
Only in our blindness
We gather thorns for flowers.
—*Massey.*

4. Education alone can conduct us to that enjoyment which is, at once, best in quality and infinite in quantity.
—*Mann.*

5. It is the season now to go
About the country high and low,
Among the lilacs hand in hand,
And two by two in fairyland.
—*Stevenson.*

6. It is by presence of mind in untried emergencies that the native metal of a man is tested. —*Lowell.*

7. When the fight begins within himself,
A man's worth something.
—*Browning.*

8. Among the changing months, May stands confest
The sweetest, and in fairest colors dressed. —*Thomson.*

9. The Hawthorn whitens, and the juicy Groves
Put forth their buds, unfolding by degrees,
Till the whole leafy Forest stands displayed,
In full luxuriance, to the sighing gales.
—*Thomson.*

10. Clever men are good, but they are not the best. —*Carlyle.*

11. Worth, courage, honor, these indeed
Your sustenance and birthright are.
—*Stedman.*

12. And watch the gold air and the silver fade,
And the last bird fly into the last light.
—*Rossetti.*

13. When April steps aside for May,
Like diamonds all the rain-drops glisten;
Fresh violets open every day;
To some new bird each hour we listen.
—*Larcom.*

14. Every one is the son of his own works.
—*Cervantes.*

15. A Lady with a lamp shall stand
In the great history of the land,
A noble type of good,
Heroic womanhood.
—*Longfellow,* of Florence Nightingale.

16. Hail, bounteous May, that doth inspire
Mirth, and youth, and warm desire:
Woods and groves are of thy dressing,
Hill and dale doth boast thy blessing.
—*Milton.*

17. That's the wise thrush; he sings each song twice over,
Lest you should think he never could recapture
The first fine, careless rapture!
—*Browning.*

18. We'll lie in the shades
Of the flow'r-covered glades,
And hear what the primroses say.
—*McLachlan.*

19. A soft answer turneth away wrath; but grievous words stir up anger.
—*Bible.*

20. Spring, with a mantle made of the gold held close in a sunbeam's heart,
Thrown over her shoulders bonnie and bare—see the sap in the great trees start! —*Blewett.*

21. Spring's last-born darling, clear-eyed, sweet,
Pauses a moment, with white twinkling feet,
And golden locks in breezy play,
Half teasing and half tender, to repeat
Her song of "May." —*Coolidge.*

22. Then came fair May, the fairest maid on ground,
Deck'd all with dainties of the season's pride,
And throwing flowers out of her lap around. —*Spenser.*

23. Charity and personal force are the only investments worth anything.
—*Whitman.*

24. One voice, one people, one in heart,
And soul, and feeling, and desire.
—*Sangster.*

25. So nigh is grandeur to our dust,
So near is God to man,
When Duty whispers low, Thou must,
The youth replies, I can.—*Emerson.*

26. Down in the budding woods unseen,
Amid mosses green,
The fair hepatica wakes to meet
The hastening feet. —*Machar.*

27. Mine eyes have seen the glory of the coming of the Lord:
He is trampling out the vintage where the grapes of wrath are stored:
He hath loosed the fateful lightning of his terrible swift sword:
His truth is marching on.
—*Julia Ward Howe.*

28. You may break, you may shatter the vase if you will,
But the scent of the roses will hang round it still. —*Moore.*

29. I know not what course others may take, but as for me, give me liberty or give me death. —*Patrick Henry.*

30. The voice of one who goes before to make
The paths of June more beautiful, is thine,
Sweet May! —*H. H. Jackson.*

31. In this broad earth of ours,
Amid the measureless grossness and the slag,
Enclosed and safe within its central heart,
Nestles the seed perfection.
—*Whitman.*

MAY, one of the most beautiful months of the year. The cold and the rigor of winter have gone, and the unpleasant heat of summer has not yet begun, while vegetation is at its richest and loveliest. As to the derivation of the name of this month, there has been considerable controversy. Perhaps the weight of opinion rests with the theory that the month was named for Maia, the Roman goddess of spring and of increase, but some scholars hold that *May* is but a shortened form of *Majores,* and that the month was so called because it was sacred to the older men, as June was sacred to young men, or *juniores.* The flower of the month is the hawthorn; its special gem, the emerald.

May is the fifth month in the year. Originally it was the third, but when the Romans placed the two newly added months, January and February, at the beginning of the year, it took its present place. It has always been one of the long months, possessing thirty-one days.

May Customs. From the very earliest times the first of May has been a time for out-of-door festivities. In Rome it fell within the period which was sacred to Flora, goddess of flowers, and flower-decked processions were common on that day. During medieval and early modern times in England the customs connected with May Day, as the first of May is called, were interesting and beautiful. On the night before, the children and young people were all excitement, for the Maypole had been erected on the village green, the gayest finery had been made ready, and every girl went to bed hoping that she might be chosen "May queen." In the morning there was the procession to the woods to bring home the "may" or hawthorn blossoms, and with these the Maypole was wreathed. The "queen," chosen by popular vote, set up her court in a little flowery bower, which she left at times to dance with her loyal "subjects" around the Maypole. Tennyson's *May Queen* gives a picture of these rural pleasures.

In recent times the Maypole festivities have had a revival. Many schools give May-day festivals, and attempt to reproduce, so far as possible, the music, the steps and even the costumes of the dancers of earlier times.

In the United States there prevailed a generation or two ago the custom of "hanging May baskets" on the eve of the first of May. Little baskets, elaborate or simple, costly or of home manufacture, were filled with wild flowers and hung upon the door knobs. It was a point of honor, as in the giving of valentines, for the donor to slip away without being discovered.

Special Days. Both Canada and the United States have one important holiday in May. In Canada this is the twenty-fourth, which is known as Empire Day and is set aside as a memorial to Queen Victoria, whose birthday it was. In the United States the thirtieth of May is sacred to the memory of the soldiers who have fought in their country's wars, and is known as Decoration Day or Memorial Day. In these volumes, under the titles DECORATION DAY and EMPIRE DAY, will be found suggestive programs for use on those occasions.

MAYA, *mah'yah,* **INDIANS,** a group of tribes who constituted the ruling race in several Mexican states, particularly Yucatan, and a part of Central America when that section of the North American continent was conquered by the Spanish (about 1520). Over a million of their descendants in Mexico and Central America still speak the Maya language. In the midst of the tropical forests of Yucatan and Central America have been found the ruins of more than forty Mayan towns, connected by paved roads and suggesting a past of splendor and advancement. Their architecture was remarkably beautiful, and the interior decoration was elaborate. Many of the buildings were built about open courts, somewhat similar to the houses of the Pueblo Indians.

The Mayas had a written language, largely pictorial. They tended their farms, wove their own cotton, were skilled in the art of making ornaments of gold and precious stones and excelled in feather work. They erected marvelous temples to their deities, worshiped stone

idols and sometimes offered human sacrifices. They paid more attention to agriculture than to warfare, and in this point differed from the Aztecs, whom they resembled in many other respects (see AZTEC).

MAY APPLE, an American herb of the barberry family, appearing in wooded tracts in the spring as a single, large-lobed, shield-shaped leaf, and followed later by two similar leaves having a large, pure white flower at their base. It bears a yellow, egg-shaped fruit, edible but with an unpleasant flavor. The root-stalk produces a drug of laxative properties. The May apple is also called the *mandrake* (which see).

MAY BEETLE. See JUNE BUG.

MAYFLOWER, the name of the vessel in which the Pilgrims sailed from Southampton, England, to find homes and religious freedom in the new world, in 1620. The *Mayflower* was a vessel of 180 tons, and was chartered from one Thomas Goffe, a shipping merchant of London, who owned the vessel. In company with her sister ship, the *Speedwell,* she sailed from Southampton on August 5, with 102 persons on board, but the *Speedwell* proved unseaworthy and had to return. After a stormy voyage of sixty-three days the Pilgrims reached a harbor which they called New Plymouth, on December 11, or December 21, according to the new style calendar (see PILGRIMS).

The Honored 102. William Bradford, second governor of Plymouth, wrote a voluminous history of the *Mayflower* adventure (for particulars see BRADFORD, WILLIAM). He gave a list of the passengers, and after thirty years added an appendix which accounted for each person after that lapse of time. The names of those on the *Mayflower* he wrote down as follows:

The names of those which came over first, in ye year 1620. and were by the blessing of God the first beginers and (in a sort) the foundation of all the Plantations and Colonies in New-England; and their families.

Mr. John Carver; Kathrine, his wife; Desire Minter; & 2. man-servants, John Howland, Roger Wilder; William Latham, a boy; & a maid servant, & a child yt was put to him, called Jasper More.

Mr. William Brewster; Mary, his wife; with 2. sons, whose names were Love & Wrasling; and a boy was put to him called Richard More; and another of his brothers. The rest of his children were left behind, & came over afterwards.

Mr. Edward Winslow; Elizabeth, his wife; & 2. men servants, caled Georg Sowle and Elias Story; also a little girle was put to him, caled Ellen, the sister of Richard More.

William Bradford, and Dorothy, his wife; having but one child, a sone, left behind, who came afterward.

Mr. Isaack Allerton, and Mary, his wife; with 3. children, Bartholmew, Remember, & Mary; and a servant boy, John Hooke.

Mr. Samuell Fuller, and a servant, caled William Butten. His wife was behind, & a child, which came afterwards.

John Crakston, and his sone, John Crakston.

Captin Myles Standish, and Rose, his wife.

Mr. Christopher Martin, and his wife, and 2. servants, Salomon Prower and John Langemore.

Mr. William Mullines, and his wife, and 2. children, Joseph & Priscila; and a servant, Robart Carter.

Mr. William White, and Susana, his wife, and one sone, caled Resolved, and one borne a shipbord, caled Peregriene; & 2. servants, named William Holbeck & Edward Thomson.

Mr. Steven Hopkins, & Elizabeth, his wife, and 2. children, caled Giles, and Constanta, a doughter, both by a former wife; and 2. more by this wife, caled Damaris & Oceanus; the last was borne at sea; and 2. servants, called Edward Doty and Edward Litster.

Mr. Richard Warren; but his wife and children were lefte behind, and came afterwards.

John Billinton, and Elen, his wife; and 2. sones, John & Francis.

Edward Tillie, and Ann, his wife; and 2. children that were their cossens, Henery Samson and Humillity Coper.

John Tillie, and his wife; and Eelizabeth, their doughter.

Francis Cooke, and his sone John. But his wife & other children came afterwards.

Thomas Rogers, and Joseph, his sone. His other children came afterwards.

Thomas Tinker, and his wife, and a sone.

John Rigdale, and Alice, his wife.

James Chilton, and his wife, and Mary, their dougter. They had an other doughter, yt was married, came afterward.

Edward Fuller, and his wife, and Samuell, their sonne.

John Turner, and 2. sones. He had a doughter came some years after to Salem, wher she is now living.

Francis Eaton, and Sarah, his wife, and Samuell, their sone, a yong child.

Moyses Fletcher, John Goodman, Thomas Williams, Digerie Preist, Edmond Margeson, Peter Browne, Richard Britterige, Richard Clarke, Richard Gardenar, Gilbart Winslow.

John Alden was hired for a cooper, at South-Hampton, wher the ship victuled; and being a hopfull yong man, was much desired, but left to his owne liking to go or stay when he came here; but he stayed, and maryed here.

John Allerton and Thomas Enlish were both hired, the later to goe mr of a shalop here, and ye other was reputed as one of ye company, but was to go back (being a seaman) for the help of others behind. But they both dyed here, before the shipe returned.

There were allso other 2. seamen hired to stay a year here in the country, William Trevore, and one Ely. But when their time was out, they both returned.

These, bening aboute a hundred sowls, came over in this first ship; and began this worke, which God of his goodnes hath hithertoo blesed; let his holy name have ye praise.

MAY FLY, DAY FLY or **SHAD FLY,** common names for a species of insects that are noted chiefly for the brief existence of the adult; from this characteristic comes the name *day fly.* The traditional belief that they live only a day is erroneous, though probably none exists longer than three weeks. They are fragile, with large forewings, small hind wings and short antennae (feelers). Most species mate during flight, and the eggs are laid in fresh water; the larvae exist for years upon the bottom of the stream, under stones covered with mud. The emergence of these insects from the water seems always to be at evening, and as they are strongly attracted by lights, they appear in great swarms around them. They are excellent bait for fish and are imitated in making artificial flies.

MAY FLY

MAYHEM, *ma'hem,* in law, is the offense of violently and unlawfully rendering a person less able to defend himself or to fight for his country in time of war. If one fears he may be drafted in war he may engage a friend to cut off his "trigger finger," injure his arm or leg or impair his eyesight. The offense is mayhem, and both parties are amenable to the law. In personal altercations, if one combatant bites off his adversary's finger or ear, the offense is punishable as mayhem. Modern statutes regard any crime of violence which results in permanent injuries as mayhem, and hold the author liable to a civil action for damages as well as to criminal prosecution. The word *mayhem* is really an older form of *maim,* and in most places the two words have the same meaning.

MAYO, *ma'o,* William James (1861-) and Charles Horace (1865-), American surgeons and sons of a surgeon, who in a small inland city have won an international reputation. The elder brother was born at Le Sueur, Minn., and educated at the University of Michigan, receiving his M. D. degree in 1883. In the same year he began the practice of surgery in Rochester, Minn. The younger brother, Charles Horace, was born at Rochester, Minn., educated at Northwestern University and Chicago Medical College, and after his graduation in 1888 began to practice in his home town, in partnership with his brother.

The brothers have founded at Saint Mary's Hospital, in Rochester, one of the most celebrated clinics in the world, visited by physicians from Europe as well as from all parts of the United States. Their patients include people from almost every civilized land. The success which the Mayo brothers have attained in their operating is almost phenomenal; a surprisingly large proportion of their patients recover. They have given especial attention to operations so difficult that they were usually regarded as practically impossible. Both brothers are members of the chief American medical and surgical societies, and have received honors both at home and abroad.

In 1915 the Mayo brothers gave to the University of Minnesota an endowment fund of $2,000,000 and their surgical laboratory for the establishment of a great surgical hospital, with the agreement that a portion of the work each year should be conducted in the brothers' hospital at Rochester (see Minnesota, University of).

MAYOR, *ma'er,* the chief executive officer of a city or corporate town in the United States, Canada, Ireland, England, and the British colonies. In the United States the mayor is elected by the qualified voters of the city for a certain number of years (commonly two years, except in smaller cities, where one year is the usual term). The mayor generally appoints all non-elective city officials, subject in most cities to the consent of the council. He is the head of the executive departments, and it is his duty to see that the city ordinances are faithfully enforced. In many cities the mayor exercises a limited veto upon all ordinances passed by the council. In many of the smaller cities, he presides over council meetings, and has a deciding vote in case of a tie. Generally, he issues and revokes licenses, and has the judicial authority of a justice of the peace. The office of mayor is dispensed with in those cities which have adopted the commission form of government or the city-manager plan (see Commission Form of Government; City Manager).

The mayor of an English municipality has less important duties than the corresponding American official. He is supposed to devote much time to duties of a social nature, and to preside over meetings connected with public-welfare movements. His most important administrative function is to act as chairman of

the meetings of the board of aldermen. He is also *ex officio* justice of the peace. The mayor is chosen by the council, his term of office is one year, and he is eligible for reëlection. The title *lord mayor* is borne by the mayors of the cities of London, Dublin and York. The lord mayor of London has jurisdiction over the ancient inner city alone, and his principal function is to maintain the hospitality of the city. To carry out this duty he is granted an allowance of $40,000 a year and the use of the mansion house.

The heads of councils in Canadian cities are known as mayors, wardens and reeves. Their chief duties are to preside over meetings of the council, to execute the laws passed for the government of the municipality, to supervise the conduct of all subordinate officers, to recommend to the council measures for the improvement of the municipality, and to see that negligent officials are punished. During their terms of office, heads of councils are *ex officio* justices of the peace.

In small cities the mayor's salary is very small; sometimes he serves without compensation. In great cities he is well paid and during his term of office gives his entire attention to the task of governing his city. The highest salaried mayor in the United States is that of Chicago, $18,000. New York City pays $15,000. The mayor of Montreal receives $10,000, the largest amount paid in Canada. W.B.G.

MAZARIN, *maz a raN',* JULES or JULIUS (1602-1661), a French statesman of Sicilian parentage, who succeeded the celebrated Cardinal Richelieu as prime minister of France. Educated by the Jesuits at Rome and in Alcala, Spain, he entered the Papal service and went to France as the Pope's messenger. Richelieu, prime minister under Louis XIII, thought well of the young Italian and persuaded him to enter the French diplomatic service. In 1632 he became a naturalized Frenchman and in 1641 was made a cardinal.

On Richelieu's death the following year he was made prime minister, and although Louis XIII died in 1643, Mazarin had so firmly intrenched himself in the graces of the queen regent, Anne of Austria, that he continued in that position much against the wishes of the French. Although he was less forbidding and severe than Richelieu, Mazarin continued the great statesman's policy of keeping the entire power in the hands of the Crown, and of unmerciful taxation, carrying out his plans so successfully that he aroused the violent enmity of both the people and the nobles of France. Resistance to his method brought on the civil war of the Fronde in 1648 (see FRONDE). He was twice expelled from court, in 1651 and 1652, but returned in 1653, and continued all-powerful in France until his death, eight years later.

MAZE. See LABYRINTH, for description and illustration.

MAZEPPA, *ma zep' a,* IVAN STEFANOVITCH (1640-1709), a famous hetman, or leader of the Cossacks, whose story has been celebrated in poetry, art and fiction. Byron's well-known lines, from his poem *Mazeppa,* express the admiration felt for him by his companions:

> Of all our band,
> Though firm of heart and strong of hand,
> In skirmish, march, or forage, none
> Can less have said or more have done
> Than thee, Mazeppa! On the earth
> So fit a pair had never birth,
> Since Alexander's days till now,
> As thy Bucephalus and thou.

He was born in Podolia, a district in Western Russia, of poor but noble Russian parents, and became a page in the service of John Casimir, king of Poland. A Polish nobleman, who surprised him in an intrigue with his wife, had him stripped and bound to his own horse. Lying upon his back, and with his head to the animal's tail, Mazeppa was borne aimlessly away. The horse took him to his own home, from which, in shame, he fled to the Ukraine in Southwestern Russia, where he joined the Cossacks. Through his strength and courage Mazeppa rose to high distinction among them, and in 1687 was elected their hetman. He won the esteem of Peter the Great, who made him Prince of the Ukraine, but later he conceived the idea of gaining complete independence for the Cossacks and for this purpose joined Charles XII of Sweden. Mazeppa took part in the Battle of Pultowa, after which he fled to Bender, where he died the same year.

MAZZINI, *maht se' ne,* GIUSEPPE (1808-1872), a celebrated Italian patriot who played a large part in the unification of Italy. He was born in Genoa, studied in the university there, and later practiced law. He had a strong desire to see the various little states into which Italy had been partitioned united under a central government, and early began agitating the subject. In 1830 he joined the Carbonari, and was recognized as so active and dangerous a member that he was exiled from Italy. He lived first in Marseilles, then in Switzerland and later in London, but in each place maintained correspondence with the liberal republican faction

in Italy and in other countries. It seemed to him that the Carbonari were not accomplishing their purpose, and he organized a new society, Young Italy, of which the object was the overthrow of all the monarchical governments in the peninsula, and the union of the various states under a republic.

In 1848, when revolutions occurred in so many European countries, Mazzini returned to Italy, and helped to organize a republic at Rome. The new government was short-lived, however, and Mazzini again went into exile, at first to Switzerland and later to London. He helped to stir up insurrections in Milan and in Genoa, and was of great assistance to Garibaldi in organizing his expeditions in 1860, 1862 and 1867. When Italy was finally unified under Victor Emmanuel, only one-half of Mazzini's dream had been realized; he had striven for a republic, not for a monarchy, and he refused to enter the Italian parliament, though repeatedly elected. In 1870 he attempted to organize a republican rising in Palermo, but was pardoned by reason of his efforts for a united Italy.

Mazzini was a man of the loftiest personal character, and his work on behalf of his country was free from any suspicion of self-seeking. The wisdom of his opposition to Cavour and the Sardinian monarchy is open to question, but concerning his motives there can be put one opinion.

MEADE, *meed,* George Gordon (1815-1872), an American general, famous as the leader of the victorious Federal army at the Battle of Gettysburg, the turning point of the War of Secession. He was born at Cadiz, Spain, of American parentage, and was educated in the United States. After his graduation from West Point, in 1835, he saw active service in the Seminole War, then resigned from the army and was employed as civil engineer in government surveys. In 1842 he reëntered the army, and during the Mexican War served with distinction under General Taylor. In the War of Secession, first as brigadier-general of volunteers, he took an active part in the conflicts at Mechanicsville, Gaines's Mill, Frazier's Farm and the second Battle of Bull Run, and for his gallantry at the Battle of Antietam he was commissioned major-general of volunteers. General Meade covered the retreat of the Federal army at Chancellorsville, and succeeded Hooker in June, 1863, as commander of the Army of the Potomac. On July 1 he compelled Lee to give battle at Gettysburg, where he won a notable victory (see Gettysburg, Battle of). In Grant's Virginia campaign of 1864-1865 Meade commanded the Army of the Potomac. After the war he had charge of various military departments, including one of the Southern districts during the days of Reconstruction.

GEORGE G. MEADE

MEADOW LARK, *med'o lark,* an American bird, commonly found in grassy fields, meadows and marshes. It is not a true lark, but belongs to the family of blackbirds and orioles, and is about the size of a robin. Its back and wings are of a brownish color, and its throat and underparts are of a bright yellow, conspicuously marked with a black crescent on the breast. Its song is a clear, melodious whistle, and is one of the first to be heard in the spring. Its summer range is from the Gulf of Mexico northward into Canada, and it winters in the Southern United States and Mexico. The meadow lark builds its nest on the ground, frequently arching it over with grasses. The eggs are four to six in number, white in color, speckled with cinnamon and reddish-brown. This bird lives for about ten years.

MEADOW LARK

Consult Chapman's *Handbook of Birds of Eastern North America.*

MEADVILLE, *meed'vil,* Pa., the county seat of Crawford County, and an important manufacturing center, is situated in the northwestern part of the state, on French Creek, ninety miles north of Pittsburgh and thirty miles south of Erie. The Erie, the Northwestern Pennsylvania and the Bessemer & Lake Erie railroads enter the city, and interurban lines extend to towns north and west. The place was settled as early as 1788 and was named in honor of David Mead, one of the first residents. In 1823 it became a borough, in 1866 it was chartered as a city, and in 1913 it adopted the commission form of government, providing for a

mayor and four councilmen. The population increased from 12,780 in 1910 to 13,802 in 1916 (Federal estimate). The area of the city is two square miles.

Meadville is primarily a manufacturing city, but in addition it is the market for a lumber and grain region, which is also rich in petroleum and natural gas. Here are located the car and machine shops of the Erie Railroad, which employ about 2,000 people. There are also large iron works, manufactories of iron and steel products, silk mills, confectionery factories, printing works and lumber mills. The city has large wholesale houses, and many churches, parks and public buildings. Besides public and parochial schools, it has Meadville Theological School (Unitarian), opened in 1844, Allegheny College (Methodist Episcopal), opened in 1815, Pennsylvania College of Music, and a public library.

MEAFORD, *me'ferd,* a town in Grey County, Ontario, on Nottawasaga Bay, an arm of Georgian Bay. It is 115 miles northwest of Toronto, and lies about midway between Collingwood and Owen Sound, being twenty-one miles by the Grand Trunk Railway northwest of the former and eighteen miles directly east of the latter. The town is the center of an apple-growing district, and among its chief industrial establishments are three apple-evaporating plants and a canning factory. Other important products are boxes, hardwood flooring, furniture, wheelbarrows, flour, blankets and yarns. The harbor accommodates ships drawing not over twenty feet of water, and there is regular steamer connection in season with other lake ports. Population in 1911, 2,811; in 1916, estimated, 3,300.

MEALY, *meel'i,* **BUG,** a troublesome member of the scale insect family, which takes its name from a powdery substance covering its body. This is an excretion of wax in the form of flourlike grains. The mealy bug lives upon tender growths and does great damage to fruit and shade trees. Only the males have wings. The female sheds her skin from three to five times before becoming full grown, and each time the legs, eyes and antennae (feelers) become smaller, while the body increases in size. Finally the power to move is lost, and as soon as she lays her eggs, or after the birth of the young (for the baby bugs of some species are born alive), she dies. Mealy bugs secrete honey dew which the ants seek, and they are frequently carried by the latter from one feeding place to another. Most of these bugs found in the United States have been brought from Europe in importations of fruit and plants. These pests may be destroyed by spraying plants with a tobacco wash or with an emulsion of kerosene.

MEASLES, *me'z'lz,* a contagious disease characterized by a rash upon the skin and by catarrh of the nose and lungs. Although it may be contracted by older persons, it occurs most frequently between the ages of one and five. In most cases a second attack of the disease is not likely to occur. Measles is more contagious than scarlet fever and less so than smallpox. It is spread by mouth and nose secretions, and may be conveyed by contact with infected hands, lead pencils, cups, spoons, etc. The germ which causes it has not been identified.

A week or two after the disease has fastened itself on the victim the first symptoms appear; these symptoms are those that accompany a bad cold, including headache, rise of temperature toward evening, weariness, and running of the eyes and nose. On the fourth day a bright red rash appears on the face, spreading to the neck, chest and extremities. Three days after its appearance it begins to decline, and is followed by a fine, branlike peeling of the skin. The rash in measles differs from that in scarlet fever (which see) in that the former has the tint of a raspberry; the latter is the color of boiled lobster. In measles, too, the rash appears in patches, while the fine eruption of scarlet fever is spread over the body more evenly. A serious and often fatal form called *black measles* is fortunately of rare occurrence.

Treatment. With proper care victims of measles usually recover, but because of the danger of complications, especially pneumonia and bronchial trouble, a physician should be in attendance. Eye and ear afflictions often result from severe cases. The eyes should be protected from bright light, the body from exposure to cold, and the cough be carefully treated. The diet should be light. It is also essential that the bowels receive careful attention. When the rash does not come out well, hot drinks, hot blankets or a warm bath will be found helpful. The patient should be kept warm and quiet for a week or two after the apparent disappearance of the disease, as the lungs and mucous lining of the bowels are then susceptible to attacks of inflammation. A child ill with measles should be kept entirely away from other children during the entire progress of the attack. W.A.E.

German Measles. Some physicians consider this disease, with its run of rather mild fever

and its rose-colored rash, as a form of measles, but by most authorities it is recognized as a separate disease. The rash, which may be limited to the face, neck and shoulders, or may extend over the entire body, sometimes closely resembles the measles rash and sometimes is more like that accompanying scarlatina. The disease is extremely infectious and most frequently appears as an epidemic, attacking children, especially. As a rule it is not dangerous, but care in guarding against colds and eye-strain is necessary. The patient should be kept in bed, should receive only such light food as is suitable in the case of most fevers, and should be given a mild fever remedy. Unless those in charge of the case are very familiar with the disease a physician should be summoned.

Consult Ruhrah's *Manual of the Diseases of Infancy and Childhood;* Koplik's *Diseases of Infancy and Childhood.*

MEASURE FOR MEASURE, a play of Shakespeare's, called a comedy, but entitled to that name only because it does not close with the death of any of its characters; for it bears throughout an atmosphere of almost unlightened gloom. Indeed, it affords the reader less of pleasure and cheer than most of his tragedies, so persistently does it dwell upon the baser passions of its characters. Only Isabella, sister of Claudio and chosen bride of the duke, is worthy to rank with Shakespeare's other heroines in goodness and in charm.

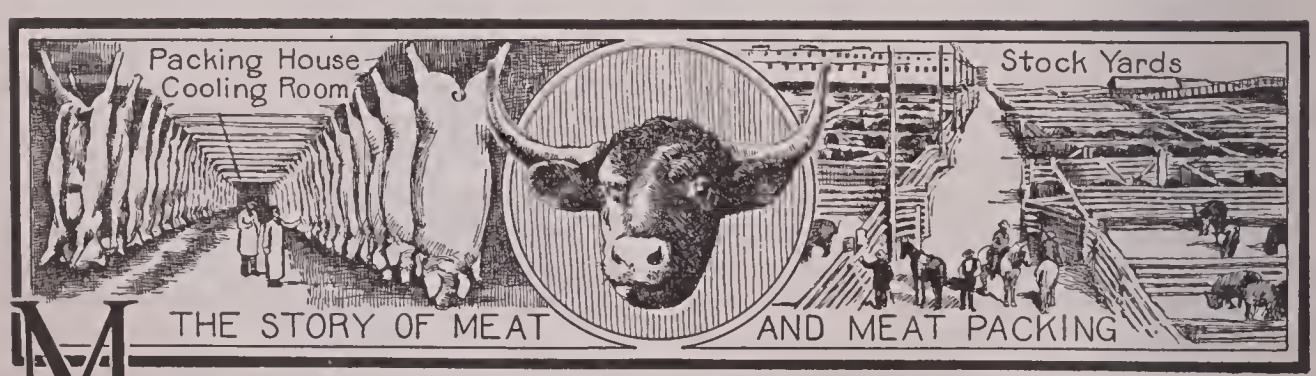
MEASUREMENT OF INTELLIGENCE, The. See Intelligence, the Measurement of.

MEASURING RESULTS OF EDUCATION. See subtitle, in article Education, page 1933.

MEASURING, *mezh'ur ing,* **WORM,** the caterpillar of a moth belonging to the geometrid (earth-measuring) family, sometimes called a *looper,* because in crawling it brings its hind feet up to the forefeet, thus making a loop of its body and appearing as though measuring the surface over which it travels. It is also able to hold itself straight and motionless away from a branch, and being of a greenish-brown color, it looks in this position quite like a tiny twig. When the grub comes from the egg it eats greedily until it splits its coat, which drops off. This occurs several times before the worm is full grown. When it reaches maturity it burrows into the earth or spins a silky cocoon on the underside of a leaf, where it changes into a winged creature. Some of the members of this family, such as the cankerworms, are serious pests, frequently laying waste whole apple orchards or cranberry marshes. See Cankerworm.

MEASURING WORMS

At left, projecting at the same angle as a branch or twig; at right, the familiar loop made in crawling.



MEAT AND MEAT PACKING. Meat is the flesh of those domestic animals raised for the purpose of supplying man with food. The people of the world eat forty-seven billion (47,000,000,000) pounds of meat each year. English-speaking people, especially Australians, are the heaviest meat-eating people in the world. However, the steadily-rising prices asked for meat have encouraged the use of substitutes, and less meat is being bought per person than formerly.

Meat consists of muscular and connective tissue and fat. It is more tender in younger animals and in the parts of the body which do not grow tough from muscular exertion. It is most commonly eaten fresh, but is also used

smoked, salted, dried or canned. The flesh of different animals varies greatly in the amount of fat and proteins contained. Nearly all the protein and ninety-five per cent of the fat in animal food are digested; in vegetable food the amount is less. The length of time taken in the process varies according to the toughness and composition of the meat; pork, for instance, is digested very slowly. But in actual nutritive value, the cheaper cuts are as rich as the more tender.

Meat should be immediately taken from the paper wrapping on delivery, washed well with a cloth wrung out of cold water and placed in a refrigerator. It is cooked in various ways, to loosen and soften the tissues, to help digestion by making it appetizing, and to kill bacteria which may be present. Some kinds of meat must be well-cooked to be healthful.

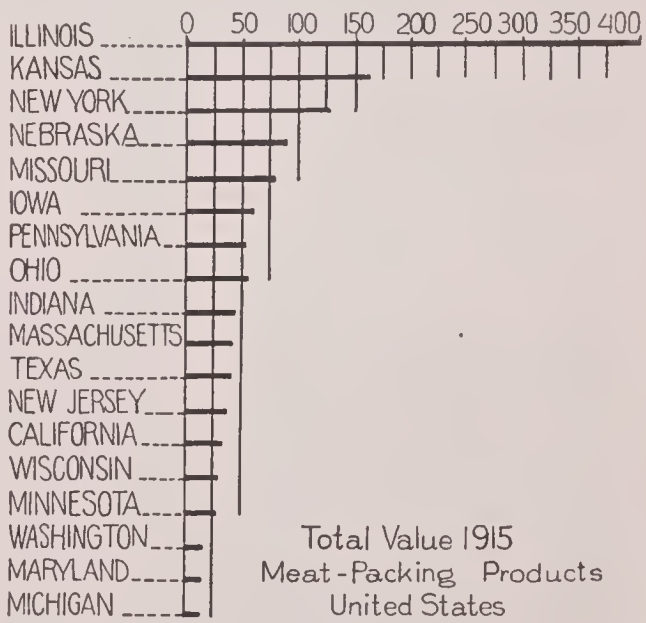
The number of *calories,* or heat-making units, to each pound, in the different meats and common articles of food of an ordinary meal, are as follows, arranged in order of high calories: Mutton, 1695; pork, 1580; beef, 1040; veal, 690; bass, 465; beans, 1605; bread, 1215; eggs, 765; potatoes, 385, and milk, 325.

Meat Packing

The slaughtering of cattle, sheep and hogs, and the preparation of their carcasses for use as food is one of the greatest of the world's industries. The terms *meat packing* and *packing industry* are somewhat misleading, for the greater part of the products of the industry is fresh meat, which has not, strictly speaking, been packed in any way. The term *packing* was first applied to the slaughtering of hogs and the preparation of their meat for the market, less than ten per cent of the meat being sold as fresh pork. In time, however, meat packing became a general term covering all the operations of preparing meat for the market, in whatever form.

Development of the Industry. The packing industry in America, as distinguished from slaughtering for household consumption, seems to have originated in New England during the seventeenth century, when large quantities of pork were exported in barrels to Europe. The industry spread slowly, and the first packing-house west of the Appalachian Mountains was not established until 1818, at Cincinnati. That city became, and for many years remained, the great packing center, but it was later eclipsed by Chicago, which still leads. Other cities which have become important in this industry are Omaha, Kansas City, Saint Joseph (Mo.), Sioux City, Saint Paul, Saint Louis, Fort Worth and Indianapolis. In the East, New York City, Buffalo and Boston lead, most of their meat products being consumed in the East or exported to Europe. In Canada the centers of the industry are Toronto, Winnipeg, Moose Jaw, Calgary and Edmonton.

Present Importance of the Industry. The slaughtering and meat-packing industry, as usually defined, includes extensive private and municipally-owned establishments, but does not include retail butchers, many of whom still buy live cattle and do their own slaughtering. Even when thus limited it is the greatest single industry in the United States. The 1,600 or more establishments have a total annual output valued at about $1,500,000,000, approximately seven per cent of the total manufactures for the country. The plants have over 100,000 employees and a total invested capital of $1,400,000,000. About one-third of the world's supply of meat is slaughtered and packed in the United States. The figures vary from year to year, but the average kill in round numbers is over 12,000,000 cattle, 6,000,000 calves, 14,000,000 sheep and lambs and 50,000,000 hogs. These figures include not only the output of the commercial packers, but also the animals slaughtered privately or locally for domestic use. In Canada the industry ranks fourth among the Dominion's activities, with an average annual product of $45,000,000.



Figures represent millions of dollars.

Organization of the Industry. All of the great packing firms have their agents or buyers in the sections in which live stock is raised. Often the buyer visits farm after farm to select the stock he wants, but he always buys in larger lots from local dealers, to whom the farmer or rancher sells. Sometimes, too, the farmer ships by rail direct to a commission man or broker in the packing centers, where the packers' buyers again appear. In spite of better transportation facilities there is a steady tendency toward decentralization. Long journeys by rail are injurious to the live stock; the animals lose in weight, even on short journeys, and there is evidence that the meat deteriorates. For these reasons, as well as for economy in shipping, the packers have gradually moved their plants nearer the regions in which cattle are raised and fed for the market. This is the meaning of the growth of the meat-packing industry in Fort Worth, Omaha, Moose Jaw and other cities far from Chicago, which latter city is still, however, far in the lead.

Processes. The slaughtering and dressing of cattle and other animals was formerly a slow hand process; now every possible labor-saving machine or device is employed. It takes less than forty-five minutes to kill and dress a steer, and less than eight minutes to kill and dress a hog. This rapidity is made possible not only by machinery but by minute division of labor. As every workman does only one thing, he becomes very skilful.

When the animals reach a packing center they are at once unloaded at the stockyards. Cattle are usually given a day's rest before being slaughtered, but it is not unusual to kill hogs within a few minutes after they arrive. With much shouting and squealing a trainload of hogs will be driven up inclined viaducts to the top of the slaughtering building. There they are swung by their hind legs on a trolley which passes the "sticker," whose business it is to kill the hog. Next the carcass is passed through scalding vats, and then through an automatic scraper, which removes almost all the bristles; the few remaining are later scraped off by hand. Scalded and scraped, the carcass is carried along, head downward, to the men who slit and disembowel it, behead it, and finally wash and trim it. The carcass is then ready for the cooler. A single corps of men can kill and dress twenty hogs a minute.

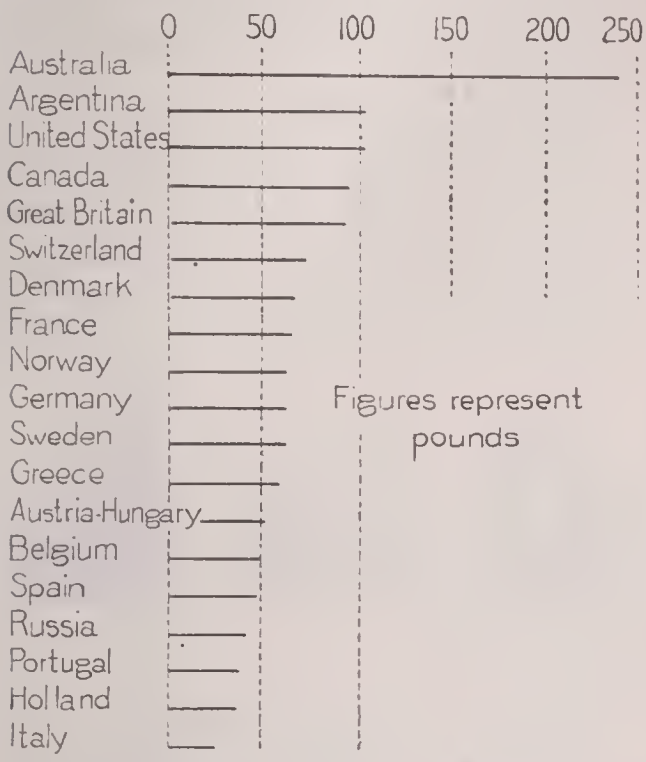
By the use of ice, ammonia or brine (see COLD STORAGE), the cooling room or cooler is kept at a temperature just above freezing, and here the meat is stored until the animal heat has entirely left it. For pork this means about three days, after which the meat is ready for the various finishing processes. Beef, if it is to be sold as fresh meat, is usually kept in a cooler for a week or ten days, and the best cuts of beef are kept longer, even three weeks. This is done not to give the meat time to cool, but to *ripen* it. Ripening, strictly speaking, is the first stage of decomposition, when the fibers begin to break and soften and the meat becomes tender. Beef which is to be shipped a considerable distance is usually loaded into cars after three days of ripening, because it can be kept as cold in the refrigerator car as in the packing house. So nearly perfect are these refrigerators that fresh meat shipped from the South American port of Buenos Aires, from Chicago or from Fort Worth will reach its destination at Liverpool, Hamburg, Vladivostok, or any other distant point, in first-class condition.

Products and By-Products. The different preparations of beef, mutton, lamb and pork may be conveniently divided into fresh meats, smoked meats, lard and tallow, and such special preparations as canned meats, dried beef and sausages. The variety of pork products is much greater than of other meats. Only ten per cent of the pork is sold as fresh meat, the remainder being made into ham, bacon, sausage, etc. Nearly all beef and mutton are sold as fresh meat (for the cuts of meat, see articles elsewhere on BEEF, PORK, HAM, etc.).

By-Products. Probably in no other industry is there less waste than in meat packing. There is a familiar saying that "the packers use every part of the hog except the squeal." There is also very little waste in the slaughtering of cattle and sheep. The hides are made into leather; the hoofs, bones and other parts not edible are made into glue, soap and oils; the intestines are used as skins for sausages; the blood and offal are dried and sold as fertilizer; the horns and hoofs are made into combs, buttons and handles for knives; the hair of cattle, the bristles of hogs and the wool of sheep are valuable for many purposes. The total value of all by-products in the United States alone is about $300,000,000, or twenty per cent of the total production of the industry.

The story of how these by-products came to be utilized is the story of the success of the meat-packing industry. Competition becoming continually keener made a continuance of the business a question of reducing waste in pre-

paring meat and of utilizing every possible part of the animal. The use of by-products will doubtless reach greater proportions; the present proportion of this part of the industry was illustrated in 1916 in a direct manner by one Chicago packing house. It prepared an exhibition of by-products obtained from slaughtering



AVERAGE YEARLY CONSUMPTION

The table shows the amount of meat eaten by each person in the countries named, in normal times. (From official reports.)

operations. The wide range of these articles and commodities is the more impressive when it is remembered that not a great many years ago but little effort was made to utilize more than the hides and hair of animals. The following were included in the exhibit:

Pure Ground Dried Blood. This is 17 per cent ammonia, and is used as a fertilizer ingredient.

Oleo Stearine. This is the edible beef fat from which oleo oil has been pressed. It is used in the manufacture of high-grade toilet soaps and candles and for softening leather.

Hoof Meal. Made from ground hoofs and used for fertilizing.

Flake Glue. Made from hides, sinew and bones, and sold to furniture makers, bookbinders and glue manufacturers.

Ox Gall. Used for medicinal purposes.

Thyroid Glands, from cattle, sheep and hogs. These possess medicinal value and are in demand by manufacturers of medical preparations.

Collar Buttons. Made from horns, hoofs and bones.

Shaving Brush Handle. Made from horns, hoofs and bones.

Buttons. Made from horns, hoofs and bones.

White Wool. Scoured, sold to manufacturers of worsted goods, woolen goods, hats, blankets, shoddy goods and knit goods.

Black Hog Bristles. Used in the manufacture of carpet-sweeper brushes and paint brushes.

Horn Pith. This is the inside of the horn and is used as a fertilizer ingredient.

Cattle Tail Hair. This is sold to hair curlers to be curled and is used by mattress makers and upholsterers who need hair longer than hog hair.

Bristles. These are particularly saved from hogs killed in winter, because the hair is longer and heavier during winter months. They are used in the manufacture of all kinds of brushes.

White Tennis Gut. The raw material is furnished to manufacturers of tennis rackets.

Violin Strings. This is made from sheep gut.

Bone. Used very widely by manufacturers of handles, buttons, combs, hairpins and fancy articles, and for the manufacture of fertilizers.

Suprarenal Gland. Used for medicinal purposes.

Lard Oil. This is pressed from choice yellow hog grease and is used principally by nut and bolt makers for keeping dyes cool when cutting.

Thymus Gland. It possesses medicinal virtues and finds sale among manufacturers of druggists' preparations.

Pepsin. Made from linings of the stomachs of cattle and hogs.

Calfskin. Used for shoe vamps and book binding after being tanned.

Sheepskin. Furnished to glove and shoe manufacturers and bookbinders after being tanned.

Pigskin. This is widely used for parts of shoes, particularly insoles, box toes and counters.

Sole Leather. From hides of steers, used by shoe manufacturers.

Ground Glue. Made from hides, sinew and bones.

Plaster Retarder. Composed of pure blood, lime and other ingredients. Sold to builders to retard the setting of plaster.

Government Inspection. In the United States as early as 1890 attempts were made to protect the consumer from diseased or otherwise unfit meat, but not until 1906 was an adequate law put in force. It provided for examination of live animals, of carcasses and also of finished products by inspectors of the Bureau of Animal Industry, a branch of the Department of Agriculture. In Canada the inspection is made under the direction of the Health of Animals branch of the Department of Agriculture. Before the animals are slaughtered they are carefully examined, and any that are diseased or injured are rejected. During the process of dressing, the carcass is again examined, for some diseases which have no visible effect on the living animal can be discovered in the meat. Even after the meat has once been inspected and stamped "Inspected and Passed," it is subject to reinspection at any time; if it has become tainted or otherwise unfit for food it is at once condemned. All condemned meats must be destroyed in the presence of the inspector.

This rigid inspection makes it certain that all meat which comes from the packing-houses is fit for food. In the United States, however, this government inspection covers only about sixty per cent of the meat production, and in Canada the percentage is about the same. A small additional percentage is inspected by local authorities, but the remainder, slaughtered privately or by local butchers, is uninspected. The percentage of privately-slaughtered meat is steadily growing less, however, and in time will probably constitute a negligible factor in the meat supply. W.F.Z.

Consult Circulars 101, 105, 154, of the Bureau of Animal Industry, Department of Agriculture, Washington, D. C.; Edelman's *Textbook of Meat Hygiene.*

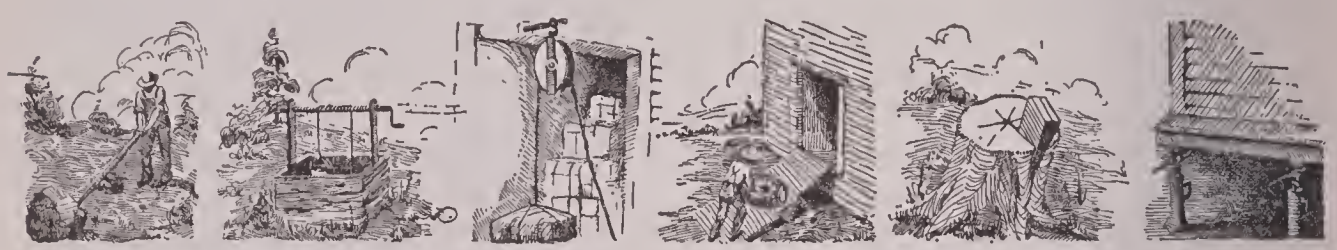
Related Subjects. The reader is referred in this connection to the following articles in these volumes:

Adulteration of Foodstuffs and Clothing	Food
Bacon	Food Products, Preservation of
Beef	Ham
Calorie	Mutton
Chile Con Carne	Pemmican
Cold Storage	Pork
Cookery	Poultry
Diet	Proteids
Digestion	Proteins
Fat	Pure Food Laws
Fish	Sweetbread

MECCA, or **MEKKA,** *mek'a,* the capital of the province of Hejaz, Arabia. Because it was the birthplace of Mohammed it is the great holy city of his followers. It is situated "two camel marches," or about sixty miles, east of Jiddah, its Red Sea port. The valley in which it lies is narrow and sandy, and scarcely any refreshing rain ever falls; its industries are confined to dyeing and the making of articles for sale to pilgrims. The newer part of the city has a modern aspect.

Mecca was given over to idolatry centuries before the birth of Mohammed, but after the hegira (which see) the prophet marched against Mecca, and the inhabitants were forced to accept his new religion as the price of their lives. The sacred mosque encloses the holy Kaaba, which was purged of its idols and became a Mohammedan shrine. At the time of the Hajj, or annual pilgrimage, which Mohammed enjoined on his followers to be taken at least once in their lives, the city is crowded with pilgrims, often to the number of 100,000. This pilgrimage lasts three or four months and is the chief source of the wealth of the inhabitants. Population, about 80,000. See MOHAMMEDANISM.

MECHANICAL POWERS, *me kan'i kal pou' erz.* The six simple machines, the elements of which more complicated machines are made, are the lever, wheel and axle, pulley, inclined plane, wedge and screw. Their mechanical power, or advantage, is the ratio of the effort put forth to do a definite amount of work to the amount of work done. That ratio is either a proper or an improper fraction, expressing the number of times less or greater the force is than the usefulness of the machine. In the former case the work done is much less than the effort put forth, but it is done in much less time; in the latter case the work done is much greater than the effort expended. Very great mechanical advantage, both of time and labor, may be obtained by various combinations of these simple machines. Each of the six mechanical powers is described in detail under its title in these volumes.



THE SIX MECHANICAL POWERS
From left to right: Lever, wheel and axle, pulley, inclined plane, wedge, screw.

MECHANICS, *me kan'iks,* the term applied by Sir Isaac Newton to the science of the construction and use of machines. It now refers to abstract force, motion and stress, without any account of the substance. Mechanics includes the study of the kinds of motion, or *kinematics;* and the causes of motion and changes of motion, or *dynamics,* a term now also applied to the whole subject. *Dynamics* includes *statics,* or the forces acting on a still body; and *kinetics,* or the motion and change of motion of a moving body (see DYNAMICS).

MECK'LENBURG DECLARATION OF INDEPENDENCE, in American history, a series of resolutions said to have been passed at a meeting at Charlotte, Mecklenburg County,

N. C., on May 20, 1775, asserting that the residents of the county should thereafter be independent of British rule. The minutes of the meeting in which the resolutions were passed were declared to have been burned in 1800, but in 1819 they were reproduced as far as possible from memory and published in the *Register* of Raleigh, N. C. The fact that the resolutions contained several phrases almost identical with the Declaration of Independence drafted by Jefferson and adopted on July 4, 1776, has caused doubt to arise as to the authenticity of the Mecklenburg Declaration. The subject was investigated by the North Carolina legislature in 1831, and it was declared that the Mecklenburg resolutions bore no resemblance to the famous Declaration of Independence. In recognition of this conclusion as to the authenticity of the document, May 20 was made a legal holiday throughout the state, and this statute is yet in force.

MECKLENBURG-SCHWERIN, *mek' len boorK shvareen',* a grand duchy of the German Empire. It is bounded on the north by the Baltic Sea, on the east by the Prussian province of Pomerania and the grand duchy

LOCATION MAP

of Mecklenburg-Strelitz, on the south by the Prussian provinces of Brandenburg and Hanover, and on the west by Schleswig-Holstein, Ratzeburg and the state of Lübeck. The Elbe River forms its south boundary for a distance of a few miles. The country is low and flat, with stretches of sand and marsh, but contains much good agricultural land and is well watered by many rivers, including tributaries of the Elbe. It has an area of 5,068 square miles (greater than that of Connecticut) and a population of 640,000, ninety-six per cent of which is Protestant. Grand Duke Frederick Francis abolished serfdom in his realm shortly before his death in 1837, but Mecklenburg-Schwerin has many semifeudal characteristics. The land is in the hands of the Crown, aristocracy and clergy, but is rented to hereditary tenants. The duchy has many schools and one university, the University of Rostock, with an attendance of 1,000, before 1914. The capital is Schwerin, with a population of 43,131 in 1911.

MEDEA, *me de'a,* according to the Greek myths, was a sorceress who had much to do with the rise to power of Jason (which see). When he came with his Argonauts to the kingdom of her father in Colchis, she helped him to obtain the lustrous Golden Fleece by putting to sleep the dragon which guarded it, and then, fearing her father, she fled with the hero. Her father pursued, and she, to gain time, killed her young brother Absyrtus and scattered his limbs on the sea. On her arrival in Thessaly she put to death by a stratagem Pelias, Jason's uncle, who had usurped the throne, and she reigned with Jason for many years, foiling his enemies by her arts and advancing his interests in many ways. Jason seems not to have found her a comfortable mate, however, for he deserted her for the young Glauce, and Medea in revenge sent to her rival a poisoned robe, in the folds of which she found an agonizing death. As a climax to her evil life Medea killed her own children, and then mounting her dragon car disappeared above the city and was never seen again. The Grecian dramatist Euripides used this story as the plot of one of his greatest tragedies, *Medea,* and it is also the theme of a modern opera by Cherubini.

MEDEA
From a painting by Sichel.

MED'FORD, Mass., a residential suburb of Boston, situated in Middlesex County, in the eastern part of the state, on the Mystic River. Boston is five miles southeast. The Boston & Maine Railroad serves the city, and electric lines connect with Boston and with cities north. In 1630 the place was settled by people from Salem, who called it Meadford, for *Mead ford*

in the Mystic River. The city, including the villages of South Medford, West Medford, Hillside, Glenwood and Wellington, was chartered in 1892. The population increased from 23,150 in 1910 to 26,234 in 1916 (Federal estimate); the state census of 1915 reported the number of people to be 30,509. The area is eight square miles.

Medford is one of the oldest cities in the state. It contains some structures of historical interest; among these are Craddock House, dating from 1634, the oldest structure in the United States retaining its original form; Wellington House, built in 1657, the Royal House, originally built by Governor Winthrop, and the Old Fort, built in 1630 as a block house, which served as a refuge against the attacks of the Indians. One of the reconstructed colonial residences contains the public library of over 35,000 volumes. Beside these the city has one of the finest armory buildings in the United States; Tufts College, founded in 1852; a $500,000 high school; the library and museum of the Medford Historical Society, which occupies the former home of Lydia Maria Child, the author; the Barnum Museum of Natural History, founded by P. T. Barnum, and the Eaton Memorial Library, donated by Mrs. Andrew Carnegie in memory of her pastor. The Craddock bridge, built across the Mystic River in 1638, was the first toll bridge in New England. In the early days the city was noted for its shipbuilding industry. C.B.G.

MEDFORD, ORE., a city in Jackson County, in the northwestern part of the state, 205 miles south of Eugene and fifteen miles from the California state line. It is on the Southern Pacific, the Pacific & Eastern and the Rogue River Valley railroads. The population in 1910 was 8,840; it increased to 14,118 in 1916 (Federal estimate). The area of the city is nearly three square miles.

Medford is in a beautiful location in the fertile Rogue River Valley, west of the Cascade Mountains. This section is the center of an extensive fruit-growing industry; chief among the fruits raised are apples and pears. Near the town are large tracts of valuable pine timber and ore deposits. Klamath and Crater lakes and National Park are among many places of scenic beauty near the city. The public buildings of Medford include a Federal building, erected at a cost of $120,000, Sacred Heart Hospital, Elks' Club and Carnegie Library. In addition to its public schools the city has Saint Mary's Academy. H.A.L.

MEDIA, *me'di a,* an ancient country in Asia, now included in Northwestern Persia, nearly corresponding to the provinces of Azerbaijan, Ardilan, Ghilan and Irak-Ajemi. It was in the days of its leadership bounded on

MEDIA, ABOUT 600 B. C.

the northeast by Hyrcania and the Caspian Sea, on the south by Susiana-Persia, on the east by Parthia and on the west by Assyria. Media was conquered by Assyria probably as early as 811 B. C., and later joined other nations against the Assyrians. After several expeditions against tyrannical Assyria, the Medes and Babylonians, under Nabopolassar, in 608 B. C. captured and burned Nineveh, the Assyrian capital, and overthrew the empire. The leadership of the Medians was short-lived, however, for in 549 B. C. the Persians, led by Cyrus the Great, conquered them and made their country a part of the Medo-Persian Empire. See CYRUS.

MED'ICAL SCHOOLS, institutions for the education of physicians and surgeons, have existed in all countries of advanced civilization since the time of Hippocrates, four hundred years before Christ. In modern times they are usually connected with universities. The methods of instruction vary greatly in different countries, and in the United States and Canada in different schools. German schools are largely under government control, and the theoretical side of the training is emphasized. British doctors have until recently received their instruction by personal association with practicing physicians, but with modern advance in laboratory needs, it has become necessary to organize schools. In France, the clinic, or attendance of students during the actual practice of doctors, is most in favor. Switzerland was the first nation to admit women to its medical schools.

United States and Canada. In America there are schools of all sorts. The best of them give thorough theoretical training, have excellent laboratory equipment and good clinical instruction. On the other hand, nearly half of the schools are decidedly inefficient. Some lack laboratories, and others have no clinical

facilities, but they are able to provide sufficient book knowledge to enable students to pass the written examinations of the state boards. Within the last few years many of the low-grade schools have been forced out of existence; of over 450 schools founded, only about 100 survive.

The usual degree given to graduates of medical schools is Doctor of Medicine (M. D.), and the ordinary length of the school course in America is four years.

A Doctor's Qualifications. The profession of medicine is not an easy path to riches, neither does it indulge hope of comparative ease. A successful doctor must be a hard and constant worker. He has little personal liberty, and must be ready to serve at any hour of the day or night. Moreover, he must be a constant student, or the advances in medical science will pass him by and he will fall into the ranks of the inefficient. When patients place their lives in his hands he betrays a trust who fails to keep informed. It is quite generally recognized that the true physician is something besides a dispenser of drugs. The genial and kindly man who brings cheer into the sick room, who gives a word of encouragement when it will help, and who is not afraid to tell his patients the truth if he finds nothing the matter with them, is the successful doctor of to-day. A further requirement is openmindedness, the ability to abandon old theories, no matter how cherished, when the advance of science shows them wrong.

Realizing that the necessary qualities are more liable to be found in men and women of education, some American medical schools now require their students to have completed a college course, and a constantly increasing number demand a partial college training, before admitting them for study. In Europe, especially in England, the standard is not so high, though superior to that of the poorer schools of this continent. S.C.B.

MEDICI, *med'e chee,* a celebrated family of Florence which had an important part in the history of Italy and France. Fortunate ventures in trade brought them wealth, and by the thirteenth century they had risen to prominence in the Florentine Republic. Cosimo (1389-1464) was the first to win wide fame. He was a liberal patron of the arts and of literature; indeed, the Medici almost all had this trait, and it was due largely to them that Florence became a brilliant center of intellectual and artistic life. Cosimo's appeal to the pride of the Florentines was so great that they called him the "Father of his Country," and seemed not to perceive that he robbed them gradually of all their liberties.

Lorenzo the Magnificent (1449-1492), the grandson of Cosimo, was the most famous of the name. He won the gratitude and love of all classes in the state by encouraging literature and art, founding institutions of learning and raising Florence to a foremost place among the Italian states. But while the people were given over to luxury and refinement, Lorenzo himself drew more and more of the powers of government into his hands, until he was practically absolute.

Under Lorenzo's son, Pietro, the Medici were removed from power in Florence, but they were reinstated in 1512, and in the next year a member of the family was raised to the papal throne as Leo X. Again in 1527 the Medici were driven from Florence, only to find their way back to power in 1530. Other members of the family who rose to great prominence were the Popes Leo XI and Clement VII, and Catharine, who became the wife of Henry II of France and during the lives of her three sons practically governed the country. In the seventeenth century pronounced signs of weakening character were visible in the family, which finally became extinct in 1737.

Consult Horsburgh's *Lorenzo the Magnificent;* Vaughan's *Medici Popes, Leo X and Clement VII.*

MEDICINAL PLANTS. Long ago, before men became interested in plants from a scientific point of view, they found that certain of them were helpful in curing illness or injury. Just how this knowledge first came to them we can only conjecture. It was probably accidental—perhaps some man with an injured foot, wrapping it in leaves to keep it from contact with the ground, found that the leaves not only protected, but helped to cure; and once the idea was suggested, other experiments would inevitably be made. At any rate, medicinal plants were the first which were definitely studied, and the earliest students of plant life were not botanists but physicians. Treatises on plants employed in medicine appeared many centuries before any systematic classification was thought of. Throughout medieval times almost the only medicines were brews of various herbs, and to-day a large proportion of the drugs in common use are prepared from plant parts. An extensive list appears at the end of the article Medicines and Drugs.

MEDICINE AND DRUGS. Men, women and children have to be fed; else they die. They cannot stand like a rock or house, nearly unchanged for months or years. Unless they daily rebuild their bodies by eating parts of animals and plants and by drinking water, human creatures soon go to pieces.

But we do not need the same food at all times. When we are thirsty we need cool water; when we are cold we need to be warmed by hot food and drink. When we are young we live mostly on milk, but when we grow up this is not sufficient; we need other food as well. When we are sick we need to eat things different from the things we take when we are well—very strange things, sometimes. Among these strange things are the parts of plants or animals or minerals that we call medicines or drugs. As long as he is physically whole a man does not need a wooden leg, but if a cannon shot has carried away his foot it is very much easier to walk with a false foot of wood fastened to his stump than to walk with a crutch.

When Medicines Are Beneficial. So it is in sickness. The healthy man does not need drugs, but in illness they sometimes help. For instance, in the front of everyone's neck, below the Adam's apple and beneath the skin, is a little bunch of flesh called the thyroid gland. Out of it comes a juice like the sap of a tree. That juice flows into the blood and is carried all over the body. It makes our bodies grow and keeps our skin, hair and nails healthy. Sometimes the thyroid gland does not work and this juice is not supplied to the body. Then the skin gets dry and cracked. The hair falls out, the nails break off, and the whole body becomes stunted and weak. About thirty years ago it was found that when a man sick with this disease was given some of the thyroid gland taken from the sheep—eating the glands in little dried pills—the sheep's gland filled the lack in the sick man's body and he got well. His bald head sprouted new hair, his skin grew soft and natural, and everything began to go right again. But as long as he lived he was forced to eat a little of a sheep's thyroid every day; else within a few days he was sick again

This sheep's thyroid is a medicine (or a drug —the two words mean the same), and it is one of the very few medicines yet discovered which really cure the disease for which it is taken. Yet in one sense even this drug does not cure but only holds the disease in check. One or two drugs are better still. They really cure. Quinine, for instance, is a drug which cures malaria. Malaria is a fever caused by a minute animal which gets into the blood through the sting of a mosquito. This animal is so small that many of them could stand side by side on the point of a pin. The mosquito's sting is hollow and the malaria "germ," as it is sometimes called, swims out through the hollow end while the mosquito is biting us and into our blood, where it has broods of young which attack and eat the blood until we get sicker and sicker.

Now about the time that the first settlers came to America it was found (some say by the monks) that the bark of a tree growing in Peru contained a bitter substance, quinine, which cured malaria if the bark was made into a sort of tea and given the sick man to drink. When the juice of the bark gets into the blood of anyone who is sick with malaria, it poisons the malaria germs and kills them so that the sick person can get well. Nowadays we do not give the bark itself but boil out of it a white, bitter powder which looks like table salt. This is what kills the malaria germ. The rest of the bark is of no use, to speak of, and we throw it away.

Quinine is one of the best of medicines because it kills the malaria germs without doing any important damage to the patient while on its way to kill the germ. Most medicines are more or less harmful to the sick person as well as to his disease. In other words, most medi-

cines are more or less poisonous and have to be used in very small amounts and for a few days only; otherwise, they may produce another sickness as bad as the one they were given to cure.

The poppy, whose brilliant flower we all know, yields a juice which when dried will put one to sleep and stop almost any pain. But it is also a poison, and if it is taken for more than a few days it poisons the body so that new pains are produced by the drug itself. These pains call for more opium to stop them, then more pain is produced and so on till the body gets what we call a "drug habit"—a craving for the drug. This is very hard to get over, as the body gets so dependent on the drug that it cries out in pain whenever the drug is stopped. Thus in time a person may die of the very medicine given him as a cure.

The leaves of the purple foxglove, a well-known flowering plant, make a medicine that is of great use to people who are sick because their hearts do not work well. Used at the right time and in the right amount, this medicine makes the sick heart do its work better for months or even years. But if too much of this foxglove leaf is taken, it will kill the patient within a few hours. Most medicines are like this in case they do any good at all. They are poisons if taken in too large amounts or if taken for the wrong disease or for too long a time.

How the Body Makes Its Own Medicine. Our bodies often make medicines inside themselves after they get sick, and most diseases get well in this way without any *outside medicine* at all. It is the greatest mistake in the world to suppose that whenever we are sick we need medicine. Very few diseases are to be cured and not many to be helped materially by any of the medicines yet discovered. Among the few really curative medicines are those formed by the body itself. Sometimes the body forms more than it needs for its own use. Then we can take some of the extra supply for the use of other people whose bodies do not form enough.

When a person is just getting over the disease that we call diphtheria, his blood contains an extra supply of the medicine which his body has just made to cure itself. If, then, we take some of his blood and give it to another person still very sick with diphtheria and not having in his own blood enough medicine of his own to cure him, we may be able to help him win the victory over his disease. It is simpler, however, to give a horse diphtheria and from *his* blood get the medicine for men. Horses bear diphtheria very easily if it is given them in the right way. They hardly feel sick at all. Yet their blood makes quarts of the medicine to cure diphtheria in human sickness. By drawing off a small quantity of the horse's blood, now and then, for a few months after he has had his diphtheria, we can get quite a store of medicine and keep it in bottles ready to be given as soon as a child falls sick with diphtheria.

Even this medicine—one of the most perfect yet found—is sometimes a little poisonous and once in a great while very poisonous indeed.

Vaccination. Vaccination means giving a person another disease like the smallpox which we want to prevent—but so mild that the vaccination itself does not make us very sick. It is only a sore arm for a few days and then we are all right. Yet this trifling disease makes so much medicine in our own blood—so much of the medicine that prevents smallpox—that for years afterwards there is still enough left in the blood of anyone who has been vaccinated to prevent his catching smallpox. This means that if the smallpox germ happens to get into our bodies it is killed off at once by the medicine which our bodies have made and kept flowing in our blood.

So we can protect people against the disease called typhoid fever by giving them a very small dose of dead typhoid germs. Even dead typhoid germs make us a little sick for a day or two. In that time enough medicine for typhoid is produced in our bodies to last us for one or two years and to kill off any typhoid germs that we may take into our stomachs in that time with our water and our milk.

Medicines Dug Out of the Earth. Most of the drugs now used come, as has been stated above, from plants and from animals. But some are metals dug up out of the earth. Mercury, for instance, which we all know from seeing it in the tubes of thermometers, is a very powerful medicine against diseases caused by germs which grow in a spiral like a corkscrew—germs called *spirochaetes*. But mercury is also a powerful poison and cannot be given long without doing more harm than good.

Ordinary iron is a good medicine for some of the diseases which makes people's blood thin or watery and their faces pale. It often fails to cure, but one of the good things about iron is that it is almost impossible to get poisoned by it in any serious way.

Medicines Usually Do Not Cure. In some diseases we give medicines, not with any hope of cure, but simply to help us bear the discomforts until the body forms its own medicine inside itself and cures the disease for us. In rheumatism, for instance, we have no drug which cures, but we can get from willow bark a drug called *salicin* which relieves the pain of the disease so that we are more comfortable while waiting for our bodies to manufacture their own medicine and stop the disease. Willow bark does not shorten the disease, rheumatism, at all, but it makes it much easier to bear.

Sometimes people's stomachs get too acid. A very sour, biting liquid (which is always there) is formed too fast and irritates the inside of the stomach. Now there are medicines which take away the bite and irritation of an acid just as cold water takes away (for a minute) the bite and irritation of sunburn. These medicines are called alkalies. *Alkali* and *acid* are opposites, as heat and cold are. Either will check the other. So when people's stomachs are too full of acid we give an alkali (cooking soda, for instance) as medicine, and when their stomachs are not acid enough, we put acid in, because a little acid makes it easier to digest our food.

Neither acid nor alkali cures stomach trouble. The cause behind the overacid or underacid condition is still untouched, and often cannot be touched by any of our "outside medicines," but only by the medicines which the body itself will usually make if we give it time and rest and fresh air. Air itself is something between a food and a medicine. Part of it is given off from the leaves of plants, and when we breathe it in we have to thank the plants for it. What we breathe out the plants in turn take in and use to build up their own leaves and stems.

One of the most valuable of all medicines is one that we have to breathe in and get into our bodies through our lungs, as we do the air. This medicine is called *ether*. It is invisible, like air, and rises from the surface of a colorless, watery-looking fluid, just as steam rises from hot water. Ether, like most drugs, does not cure any disease, but puts us to sleep and makes us insensible to pain, so that a surgeon can cut into our bodies with a knife, cut off a leg or sew up a wound or do whatever needs to be done.

Before ether was discovered, soon after the year 1800, people had to bear the pain of surgical operations or get along somehow without them. Now the patient feels nothing until the surgeon has finished his work and the effect of the ether has died out. Unfortunately, like most drugs, ether does some harm along with much relief to pain. When we breathe it into our lungs it irritates them, makes us cough and sometimes stirs up disease germs in the lungs—germs which the body's own medicine had nearly killed off. Stirred up by the ether, they may come to life and cause serious lung trouble. No one with weak lungs should ever take ether. On strong lungs it has almost no bad effects.

Dangerous "Secret Remedies." One of the worst things a person can do for his health is to take any medicine which is a "secret remedy." Unless one knows what a medicine is and what it is to do within the body, he may be taking poison. No cook would put into the food she cooks any ingredient that she knows nothing about. But inside our bodies there is going on all the time a sort of cookery which can easily be made to go wrong and to produce poisons within us if we drink medicines about which we know nothing except what the maker tells us in his advertisements. Many "patent medicines" contain so much alcohol that they are merely expensive forms of whisky. It is always a foolish thing, sometimes a dangerous thing, to take any "patent medicine" or any "secret remedy." Before taking any medicine one should always find out from a doctor just what it is and whether it will do good.

Above all, let it be repeated that for at least nine-tenths of all diseases the best medicines are those that the body itself makes. This means that most diseases cure themselves or are cured by nature, not by doctors or by their medicines. Some drugs are useful because they help us to *bear* the disease though not to *cure* it, but in many diseases our man-made drugs cannot do even this. Doctors themselves take very little medicine when they are sick. Others should follow their example and not expect the doctor to give them medicine for most diseases.

If medicines are necessary they need very seldom be nasty. That is an exploded idea. Most medicines can be so covered in with gelatin and sugar that we swallow them without tasting them at all. It may take a little more money or a little more trouble to get medicines put up in tasteless form, but it can usually be done.

Never take a medicine without a doctor's directions. Never take one without under-

standing what it is for and whether the doctor would take it himself if he had the same disease. Do not expect medicine to cure disease, except in rare instances. Do not forget that most medicines are either useless or poisonous if taken for more than a few days. Persistent drugging is usually bad. R.C.C.

Important Connected Articles. The reader will receive much more information of value in connection with this subject by reference to the following articles in these volumes:

Education, subtitle *Hygiene of Education*
Health Habits
Life Extension
Mental Handicaps

Related Subjects. Titles of articles in these volumes relating to medicine and drugs are as follows:

Acetanilid
Aconite
Allopathy
Anesthetic
Antidote
Antipyrene
Antiseptic
Antitoxin
Arnica
Asafetida
Astringent
Belladonna
Bitters
Boneset
Calomel
Cascara
Catechu
Caustic
Chamomile
Chiropractic Healing
Chloral
Chloroform
Cinchona
Cocaine
Cubebs
Disease
Disinfectants
Dogbane
Elixir
Emulsion
Epsom Salts
Ergot
Ether
Formaldehyde
Fumigation
Gargle
Germ
Hartshorn
Homeopathy
Hydrotherapy
Hygiene
Hypodermic Injection
Hyssop
Inoculation
Iodine
Ipecac
Jalap
Laudanum
Lunar Caustic
Materia Medica
Morphine
Nux Vomica
Orthopedics
Osteopathy
Pancreatin
Pathology
Pepsin
Pharmacopoeia
Pharmacy
Phenacetine
Quinine
Salol
Salts
Salts, Smelling
Sarsaparilla
Sassafras
Scammony
Sedative
Seidlitz Powders
Serum Therapy
Skin Grafting
Snake Root
Sorrel
Spikenard
Stramonium
Strychnine
Styptic
Tartar Emetic
Therapeutics
Tonic
Toxicology
Toxins
Vaccination
Veterinary Medicine
Virus
Witch Hazel

PHYSICIANS

Eustachio, Bartolommeo
Galen, Claudius
Gall, Franz Joseph
Galvani, Luigi
Gorgas, William Crawford
Hahnemann, Samuel Christian
Harvey, William
Hippocrates
Jenner, Edward
Kane, Elisha Kent
Keeley, Leslie
Koch, Robert
Lister, Sir Joseph
Mayo, Charles H. and William J.
Mesmer, Friedrich A.
Morton, William James
Morton, William T. G.
Nordau, Max Simon
Paracelsus
Rush, Benjamin
Simpson, James Young
Virchow, Rudolf
Whitman, Marcus

MED'ICINE HAT, a city in Alberta, in the southeastern part of the province, about twenty-eight miles west of the Saskatchewan boundary. It is popularly known as the "Gas City," from the abundance of natural gas in the vicinity, and Kipling once styled it "the town that was born lucky." It is on the main line of the Canadian Pacific Railway, 180 miles southeast of Calgary, 258 miles west of Moose Jaw, and 657 miles west of Winnipeg. The Canadian Northern Railway is building a branch line from Medicine Hat to Hanna, a division point on its Saskatoon-Calgary branch. Like most of the cities of Western Canada, Medicine Hat has had a remarkable growth, its population increasing from 1,570 in 1901 to 5,608 in 1911; in 1916 it was 9,269.

Medicine Hat lies in a rich farming region, and is an important flour-milling center, the combined capacity of its mills being 8,000 barrels a day. Linseed oil, clay and cement products, pumps, farm implements and other machinery are among the chief products of the city's industrial establishments. In spite of its numerous mills and factories, Medicine Hat is absolutely free from smoke, and presents a neat, clean appearance. This condition is due to the use of natural gas, which gives off no smoke, for heating, lighting and manufacturing purposes. The Medicine Hat district is said to be the greatest natural-gas field in the world. The city itself owns about twenty wells, and also the electric light and water systems, the latter installed at a cost of more than $1,000,000. Conspicuous among the public buildings are the fine post office, the armory, a large Roman Catholic convent and the general hospital. Medicine Hat is often referred to by Americans and by Canadians from the East as an exceedingly cold place in winter, but the fact of the matter, as shown by the reports of the Dominion Meteorological Service, is that its average winter temperature is considerably higher than that of many other Canadian towns in the same latitude.

MEDICINE MAN. See INDIANS, AMERICAN.

MEDINA, *ma de'nah,* a city in Arabia, one of the holy cities of Islam, held in extreme veneration by the Mohammedans, since it contains the tomb of the Great Prophet, Mohammed.

THE WORLD'S EARLIEST CIVILIZATION WAS NEAR ITS SHORES

It is second only to Mecca as an objective point for pilgrims. In this city the prophet carried on his labors after his flight from Mecca. Medina, encircled by walls, is situated in a fertile plain about 250 miles northwest of Mecca, and was formerly the capital of the Islam Empire. See HEGIRA; MECCA.

MEDITERRANEAN, *med i ter a' ne an,* **SEA,** a great irregular inland sea lying between Europe, Asia and Africa, covering an area of 2,484,000 square miles, over five times that of all of the Great Lakes.

As is implied by its name, which is derived from the Latin *medius,* meaning *middle,* and *terra,* meaning *earth,* it was anciently the center of the world's life and commerce. The Phoenicians, the boldest navigators of the ancient world, sailing its length and through the Strait of Gibraltar, turned back, says a legend, leaving an inscription upon the rocks reading "*ne plus ultra*" (no more beyond).

This sea was the highway which brought the Asiatic colonists to Greece, Rome and Carthage, and for over 3,000 years it was the great thoroughfare of the world. The oldest works of classic literature describe the wanderings of the Greeks and Romans upon the Mediterranean waters and shores. Every great power of the ancient world bordered the Mediterranean or its smaller seas, the Tyrrhenian, Adriatic and Ionian seas surrounding Italy; the Aegean, east of Greece, and the Black, or Euxine Sea, on whose straits was situated the ancient city of Byzantium, now Constantinople. The islands of Cyprus, Crete and Sicily, which broke the journey from Greece and Rome to Asia and Carthage, and Sardinia and Corsica, between Italy and Iberia, were important as trade centers. The ancient galleys of Carthage, Greece and Rome battled upon Mediterranean waters for the world's supremacy. The narrow pass of Gibraltar, where a great fortress has been built by nature, was the only entrance open to barbarian ships, and the ancient powers were thus safe from outside invasion.

Since the opening of the Suez Canal in 1869 the Mediterranean has been the great artery of Europe-Asiatic trade. When Napoleon occupied the town of Suez in Egypt, he conceived the idea of the canal joining the Mediterranean and Red seas, opening a route to Asia by way of the Indian Ocean. Over 4,000 vessels now pass through the canal each year. The importance of the Mediterranean as a trade route has caused the expansion of European powers into Northern Africa. During the great War of the Nations, which broke upon the world in 1914, the Mediterranean again became a center of warfare. The fleet of England and France occupied the sea in the northeast, near the Bosphorus, where against the Turks the great naval battles of the Dardanelles were fought without success. Germany lined the sea with mines and submarines for a distance of 500 miles, sinking not only ships of war, but also neutral liners.

The calm, blue waters and beautiful shores of the Mediterranean have long been the winter playground of Europe. From Nice, in France, to Genoa, in Italy, the famed Riviera stretches (see RIVIERA).

E.D.F.

ME'DIUM, a term revived by the practices of modern spiritualism to indicate the specially-endowed person through whom it is claimed mysterious phenomena and messages from the other world are transmitted. The term is connected with the ancient idea of specially-endowed persons (like the ancient oracles), but more particularly with the susceptibility displayed by the subjects of mesmerism or animal magnetism. See HYPNOTISM; SPIRITUALISM.

MEDULLA OBLONGATA, *me dul'a ob long ga'ta.* See BRAIN; NERVOUS SYSTEM.

MEDU'SA, in Greek legend, one of three daughters of the sea-god, Phorcys, known as the *Gorgons,* whose home was on the shore of an ocean where the sun never shone. Stheno and Euryale, the sisters, were immortal, but Medusa was mortal, and in her youth was very beautiful. She boasted of her beauty to the goddess Athene, who through jealousy changed her into a monster with brazen teeth and claws and with serpents for hair. She became so hideous that all who beheld her were turned into stone. Perseus cut off her head, which Athene placed in the center of her shield. See PERSEUS; MYTHOLOGY.

MEDUSAE, *me du'see,* tiny jellyfish shaped like an umbrella or bell, each with a short central stem and several pairs of slender coiling feelers which trail in the water. It is from the resemblance to the head of the horrible Gorgon Medusa with the snaky locks (see MEDUSA) that this little animal is named. The eggs develop into creatures which attach themselves to stones or seaweed and grow to cylindrical polyps, which in turn bud, almost like plants, into other polyps, until a branching colony is formed. Then the medusae swim away from the latter to form new groups. Scientists now apply the term to the free-swimming stage in the development of any animal belonging to the group which includes the hydra, sponge, sea anemone, etc. (see COELENTERATA).

MEERSCHAUM, *meer'shawm,* a porous substance that resembles white clay and is so light that it will float on water. From this peculiarity it received its name, which is the German for *sea foam.* Meerschaum is a compound of magnesium, silica and oxygen. It is obtained in large quantities in Asia Minor, where it occurs in small lumps in masses of clay. It is used chiefly in the manufacture of tobacco pipes; these are white in the bowl when new, but color a rich brown by continued use and careful handling; when the bowl is warm the hand must not touch it. Meerschaum pipes of good quality sell at prices ranging from $3 to $15. An inferior variety found in Spain is used for a building stone.

MEGANTIC, *me gan'tik,* the county town of Frontenac County, Quebec, formerly known as, and still popularly called, "Lake Megantic." It is situated in the extreme southeast part of the province, on the north shore of Lake Megantic and about twenty miles north of the United States boundary. Steamers ply between the towns and summer camps on the lake and on Chaudière River, which issues from the lake at Megantic. The town is the terminus of one line of the Quebec Central Railway, and is also served by the Halifax-Montreal short line of the Canadian Pacific. Megantic is 115 miles south of Quebec, 175 miles east of Montreal and seventy miles east of Sherbrooke. It is an important tourist center, especially for summer visitors to the Maine woods, but is also commercially noteworthy for its large pulp and sawmills. Population in 1911, 2,399; in 1916, estimated, 3,000. D.L.L.

MEGAPHONE, *meg'a fohn,* a form of speaking trumpet used to make the voice carry farther than ordinary speaking distances, or to direct sound to a given point in greater volume. The name comes from two Greek words, *megas,* meaning *great,* and *phone,* meaning *sound.* One form of megaphone serves to help slightly-deaf people to hear, the other to help increase the range of the voice. The megaphone that assists in hearing was invented by Edison for deaf people or persons listening to far-off sounds. Two large funnel-shaped receivers collect the sound-waves, which are carried to the ear by tubes. The other is the familiar funnel-shaped horn used by a person who wishes to make his voice heard a great distance or in a place where there is considerable noise. Sailors use it in hailing other ships or in speaking through fogs; on the stock exchange market quotations are called through a megaphone; and one sees these instruments at the mouths of announcers in front of amusement tents.

MEISSONIER, *meh so nyay',* JEAN LOUIS ERNEST (1815-1891), a French painter, among the first to practice microscopic or miniature painting in oils. Great detail and finish is characteristic of all his work. While illustrating books for Paris publishers as a means of livelihood, he perfected his art, and then exhibited in the Salon year after year. The subjects of his best-known works are historical and military. Among the most famous is a set of four, the *Napoleon Cycle,* one of which is called *1807.*

It is owned by the Metropolitan Museum of New York, and the sum of $66,000 was paid for it. Meissonier received unusually high prices for all his work. He was born in Lyons, but spent most of his life in Paris, where he died.

MEISTERSINGERS, *mi'ster sing erz,* the German form of *mastersingers* (which see).

MEKONG, *ma kong',* **RIVER,** or **CAMBO'-DIA RIVER,** the largest stream of the Indo-Chinese peninsula. Rising in the Kuenlun Mountains in Thibet, it flows in a southeasterly direction along a course of 2,800 miles and discharges by several mouths into the China Sea. At Pnom Ponk, in Cambodia, a branch extends in a northwesterly direction to the Tonle Sap (Great Lake). At various points along its middle course rapids and sandbanks occur; these interrupt navigation, and vessels therefore use it as a waterway for only a short distance above its delta.

MELANCHTHON, *me langk' thun,* PHILIPP (1497-1560), a German reformer, the associate of Martin Luther in the Protestant Reformation, was born at Bretten in Baden. While his fame rests upon his connection with the great religious crisis named, he was before that "the schoolmaster of Germany," a great educator who established many schools in the spirit of the modern normal school. His family belonged to the middle classes, bearing originally the name Schwarzerde *(black earth),* which, according to custom, he changed to its Greek equivalent upon entering the University of Heidelberg. He received his bachelor's degree there at the age of fourteen, and the master's degree at Tübingen three years later. His knowledge of Greek led to his appointment as professor at the newly established University of Wittenberg in 1518. There his lectures became immensely popular, and criticism because of his youthful appearance soon turned to admiration of his unusual ability.

PHILIPP MELANCHTHON

Through Luther's influence he began to champion the cause of the Reformation, and the two became closely united at the "Leipzig Disputation" in 1519, when they confronted their opponent, Dr. Eck, and ably defended their cause.

Melanchthon's literary work changed gradually from absorption in classical studies to the more urgent interests of theology, his outlines of which were published in 1521 under the title of *Loci Communes.* He assisted Luther in translating the Bible; his insistence on accuracy was an important factor, set, as it was, against the forcefulness and greater beauty of Luther's style. The *Apology* appeared in 1531; in it he justified the Augsburg Confession of the previous year. In all things he was farseeing and moderate.

The last years of his life were clouded by endeavors to heal breaches between the followers of Luther and of Calvin, between the "Philippists" and the strict Lutherans, and even between the fiery spirit and teachings of Luther and himself. His life was not dramatic, for while demanding progress, he was opposed to revolutionary changes; he was a peacemaker, a man of powerful intellect. Striving constantly for Christian unity, his greatest hope was that "all churches might be of one mind in Christ."

Consult Schaff's *Creeds of Christendom;* Richard's *Philipp Melanchthon.*

MELANESIA, *mel a ne' shi a,* a name applied to a group of Pacific islands lying to the east of Australia. Melanesia is one of the divisions of Oceania, and the islands included in it are shown on the colored map accompanying the article OCEANIA.

MEL'BA, NELLIE (1865-), an Australian operatic soprano singer, classed with the foremost musical artists of her day. She was born in Melbourne, where she began her musical education, and later studied under the famous Madame Marchesi, in Paris. Her début was made in Brussels, in 1887, in the opera of *Rigoletto.* She first appeared in America at the Metropolitan Opera House, New York, in 1893, where she sang the leading rôle of *Lucia di Lammermoor,* and she has made operatic and concert tours in all the leading countries of the world. Madame Melba has sung with notable success the soprano parts in *Hamlet, Romeo and Juliet* and *La Traviata.* She appeared in the latter opera during the 1915-1916 season of

MADAME MELBA

the Chicago Grand Opera Company. Though she lacks dramatic gifts of the highest order, her voice is unsurpassed for purity and sweetness of tone. Her family name was Mitchell, which she discarded for Melba, the latter being suggested by the name of her native city. In 1882 she married Charles Armstrong, an Englishman.

MELBOURNE, *mel'burn,* a manufacturing and shipping center of first importance, capital of the Australian state of Victoria, and next to Sydney the largest city in the Commonwealth. It is situated about 500 miles southwest of Sydney, on the Yarra River, which flows into Hobson's Bay. This bay is a northern bend of the spacious harbor on the southern coast of Australia known as Port Phillip, the entrance to which is about forty miles from the city. Along the shores of the bay the Melbourne suburbs extend for over ten miles, but the city proper lies about three miles inland on the north bank of the Yarra. The suburb of Port Melbourne, two and a half miles from the business center, is the chief port, but vessels of twenty-two-foot draft can sail up the Yarra to the heart of the city, which has an interstate trade of nearly 3,000,000 tons a year. The tonnage of vessels entering the port from foreign countries is about 690,000 a year.

Melbourne is a busy, prosperous place of modern aspect. The state railway system of Australia has its center in this city. The principal streets are ninety-nine feet wide and are substantially paved and well kept, and the residents enjoy the advantages of gas, electric lighting, a good water system and street tramways. No other city of the same size has such splendid public buildings as Melbourne. Among these are the magnificent Parliament House, crowning one of the two hills on which the city is built; the Treasury building; the law courts; the post office and other government buildings; and a spacious structure housing the public library, national gallery, technological museum and sculpture gallery. Parks, pleasure grounds, public gardens and commercial buildings of imposing architecture add much to the attractiveness of the place. Avenues, gardens and parks are adorned with numerous statues and monuments, including one erected in honor of Queen Victoria.

Melbourne is the residence of an Anglican bishop and a Roman Catholic archbishop, and both of these religious bodies have erected fine cathedrals; the Scots, the Wesley, the Independent and the Baptist churches are also noteworthy. The city's educational interests are represented by the university, which occupies several acres about a mile from the business center, Trinity, Ormond and Queen's colleges, various high schools and academies under denominational or private control, and numerous state schools. Industrially the city and suburbs are in a flourishing condition; among the important industries are tanning, wool washing, bacon curing, flour milling, brewing, brickmaking, iron founding and the manufacture of pottery, candles, cigars, jewelry, furniture, boots and shoes, clothing and woolen and leather goods.

In 1835 a little settlement occupied the site of the city, which consisted a year later of only thirteen buildings. By 1841 a town of 11,000 had grown up, and after the discovery of gold at Ballarat in 1851 its population rapidly increased. Melbourne became the capital of Victoria when that state was organized (1851), and in 1901 it was made the temporary capital of the Australian Commonwealth (see AUSTRALIA, subhead *History*). Population of city proper and suburbs in 1913, estimated, 651,000. B.M.W.

MEL'FORT, a town in Central Saskatchewan. It is on the Winnipeg-Prince Albert line of the Canadian Northern Railway, 494 miles northwest of Winnipeg, eighty-five miles west of Hudson Bay Junction, and sixty-two miles east of Prince Albert. A branch line from Melfort to Humboldt is under construction. The town is the distributing and shipping point for a rich agricultural district; its principal industrial and commercial establishments are grain elevators, lumber yards, farm implement agencies, hardware and general stores, machine shops and a government creamery. The shipment of hogs, horses and cattle is an important business. The Dominion government building and the $60,000 high school are attractive structures. Melfort has a Dominion lands office, and is a customs port of entry. Population in 1911, 599; in 1916, estimated, 1,800.

MELILOT, *mel'i lot,* the name of a group of cloverlike plants belonging to the pea family, commonly called *sweet clover.* Two species, white and yellow melilot, are familiar residents of the waste lands and roadsides of the United States, Europe and Asia. The tiny drooping flowers, which resemble their cousins, the pea blossoms, are delightfully fragrant and attract large numbers of insects, especially the honeybee. These flowers are used in the manufacture of toilet water and perfumery, and dried branches of the plant will give a pleasing scent to a room.

The blue melilot, native to Northern Africa, is cultivated in Switzerland and the Tyrol and is used for medicinal purposes. Its flavor is also imparted to the Chapzieger cheese of Switzerland, and when the cheese is made in large quantities the odor of melilot can be discerned even at a distance. Sometimes the herbage is fed to cattle, but the plant is generally considered a troublesome weed.

MELODRAMA, *mel o drah'ma,* originally a dramatic performance alternated with vocal and instrumental music, the name being a combination of the Greek *melos,* meaning *song,* and *drama,* meaning *play* or *action.* The term is now used to designate a romantic play which depends on unnatural situations and sensational incidents for its interest, and is applied very commonly to plays that find favor in theaters of the cheaper class, whose audiences enjoy thrilling episodes involving persecuted heroines, wicked villains and hairbreadth escapes. Dramas of tense action which possess real merit, such as William Gillette's dramatization of the *Adventures of Sherlock Holmes,* may be classed as melodrama of a higher order.

MELON, *mel'un,* the name applied to the fruit of several varieties of plants belonging to the gourd family, all of which have climbing or trailing vines and large leaves. The best-known melons are the *muskmelon* (including the *cantaloupe*) and the *watermelon.*

Related Subjects. The reader is referred to the following articles in these volumes:

Casaba	Muskmelon
Gourd	Watermelon

ME'LOS, or **MILO,** *me'lo,* an island possession of Greece, situated in the southwestern part of the Aegean Sea, and famed as the place where the statue of Venus of Melos was found in 1820 by a peasant. The island is thirteen miles long and eight miles wide, and has an area of about sixty square miles. It was settled by the Dorians at an early date and taken by the Athenians in 416 B.C. The present population is 4,864. See VENUS DE MILO.

MEL'ROSE, MASS., a suburb of Boston, situated seven miles north of that city, in Middlesex County, and on the Boston & Maine Railroad. Interurban lines connect with Boston and with cities and towns in the northeastern part of the state. The city has a location adjoining Middlesex Fells, a state reservation of 1,800 acres, famous for its natural beauty. Although it is a residential suburb, the city has manufacturing establishments, the most important of which are devoted to the making of boots, shoes and rubbers. Melrose, which includes the villages of Melrose Highlands, Fells and Wyoming, was settled as early as 1633. Until 1649 it was a part of Charlestown, and from that time until 1850, when it was incorporated as Melrose, it was a part of Malden. In 1900 it received the city charter. The population increased from 15,715 in 1910 to 17,445 in 1916 (Federal estimate). The area is nearly five square miles.

MELT'ING POINT, or **FUSING,** *fuz'ing,* **POINT,** in physics, is the temperature at which a solid substance melts or becomes liquid. The required temperature is hardly the same for any two substances, and varies from 32° F. for ice to 3231° F. for platinum. In metals it is found that the greater the purity the higher the temperature of the melting point. Pure iron melts at 3099° F., gold at 1072°, zinc at 418°, tin at 320°, lead at 324°, silver at 1174°, aluminum at 1341°. Mercury when solidified melts at a temperature of forty degrees below zero.

MEL'VILLE, a town in southeastern Saskatchewan. It is a passenger and freight divisional point on the main line of the Grand Trunk Pacific Railway and also on the Regina-Melville branch, which is projected to connect with the Hudson Bay Railway at Pas. It is 279 miles northwest of Winnipeg, 188 miles southeast of Saskatoon and ninety-eight miles northeast of Regina. Melville is the center of a prosperous farming region, and with the exception of the railway shops all its important business interests are dependent on agriculture.

The town owns and operates a hospital and a skating and curling rink as well as its waterworks and electric-light system. It is the seat of a judicial district and of a Lutheran College. The town hall, which was completed in 1912, cost $75,000. Melville is the nearest point on the Grand Trunk Pacific's main line for the Qu'Appelle Valley, where there is good fishing and hunting. The town was founded in 1907, and was named for Charles Melville Hays, then president of the Grand Trunk Pacific. Population in 1911 was 1,816; in 1916 it was 2,100. F.H.C.

MELVILLE, *mel'vil,* **ISLAND,** an island in the Arctic seas north of the American continent, belonging to the group discovered in 1819 by Captain William Parry, a British navigator. It lies north of Melville Sound and between Prince Patrick and Bathurst islands. It is very irregular in shape, about 200 miles long and 100 miles wide. From April to the end of July

grass and flowers grow, but the rest of the year it is ice-bound—the home of the reindeer and musk ox. Deposits of coal have been found on the island, which is of lime and sandstone formation.

MELVILLE PENINSULA, *mel'vil pen in' su la,* a wild, desolate peninsula of North America, extending north of Hudson Bay, in the North West Territories of Canada. The Rae Isthmus connects it with the mainland, it is separated from Cockburn Island on the north by Fury Strait and Hecla Strait, and from Baffin Land on the east by Fox Channel. The discovery of this region should be credited to the early expeditions of Sir John Franklin, although it was named by Sir William Parry, who passed the winter of 1821-1822 on the peninsula and was the first white man to explore it.

MEMBRANES, *mem'braynz,* derived from a Latin word *membrana,* meaning *parchment,* is the term applied to thin sheets of elastic tissue which cover and line various organs and cavities of the body. Among the most important are *mucous, serous* and *fibrous* membranes.

Mucous Membranes line those passages which open externally and through which matter is taken into the body or eliminated from it. They are soft, velvety and of a dark-red color, and secrete a clear, sticky fluid (see MUCUS) which keeps the membranes moist and flexible and serves to protect them. The mucous membranes form the lining of such parts of the body as the mouth, the alimentary canal, the inner surfaces of the eyelids and the Eustachian tubes. Some of them secrete not only mucus, but other fluids for special purposes. These special secretions are represented by the saliva and the gastric and pancreatic juices, which help digest the food (see DIGESTION).

Serous Membranes are those which line cavities not in open communication with the air. The largest and most important of these, the *peritoneum,* is a thin, closely-woven network of cells covered by a single layer of flat cells. It lines the abdominal cavity and also covers the outside of all the abdominal organs, helping to hold them in place. It is kept moist by a fluid produced by the lymphatic circulation (see LYMPH), and its smooth surface permits the organs of the abdomen to move easily. Other important examples of serous membrane are the lining of the sac around the heart (the *pericardium*) and that surrounding the lungs *(pleura). Synovial membrane* is the name applied to a form of serous membrane which lines the cavities of the joints. The synovial membrane secretes a fluid resembling the white of an egg, the purpose of which is to moisten and oil the joint so it will turn smoothly and easily.

Fibrous Membranes are not moistened by a fluid, but add to the strength of the parts they surround, and are represented by the *periosteum* around bones, the *dura mater* on the inside of the skull and the fibrous membrane of the spleen. The periosteum not only covers bones, but it affords an attachment for muscles, carries blood vessels and nerves, nourishes the bone and reproduces its cells. S.C.B.

MEM'LING, or **MEM'LIC,** HANS (1430?-1494), one of the early Flemish painters, notable for the great number of his canvases. His works are noted for their accuracy, grace, beauty and tenderness of feeling; however, he had a tendency of crowding many figures into one scene, which often marred the unity of his conception. He was a pupil of Van der Weyden, whom he surpassed. His most noted works are sacred subjects, including *The Last Judgment, Seven Sorrows and Seven Joys of the Virgin, Marriage of Saint Catharine, Adoration,* several Madonnas, and fourteen small paintings that adorn the shrine containing Saint Ursula's relics at Cologne, Germany. Very little is known about Memling. He was born at Bruges, where he spent most of his life. Many of his paintings are still to be found there, the most notable being the decorations for the Hospital of Saint John.

MEM'NON, in Greek legend, the son of Tithonus and Eos, and king of the Ethiopians, whose kingdom was on the west bank of the Nile. He went to help his uncle, Priam, against the Greeks, after the death of Hector. Among his valorous deeds was the slaying of Antilochus, but he was slain himself by Achilles before his warriors could come to his aid. Zeus, taking note of the tears of his mother, bestowed immortality upon him. Every morning his mother wept for him, and the sparkling dew drops were said to be her tears. See TROY.

The "Vocal Memnon." One of the colossal statues of Amenhotep III, set up at Thebes by one of the Pharaohs, which, becoming popularly known as the *Vocal Memnon,* acquired a wide fame. Each morning it emitted musical sounds when the sun's rays touched the statue. This action was probably due to the passage of air through the damp, porous stone, caused by the sudden change of temperature at early sunrise; however, the impressionable natives

believed the sounds to be Memnon's morning greeting to his mother. The musical notes ceased after the statue was restored by Severus.

THE "VOCAL MEMNON" AT THEBES

MEMO'RIAL DAY. See DECORATION DAY.

MEMORY, *mem'o ri.* Occasionally there is a person who possesses a power of memory which seems to others little short of miraculous. Lord Macaulay could repeat accurately a long poem after hearing it read once, and it is said that had all copies of *Paradise Lost* been destroyed, he could have restored the poem from memory. There was "Blind Tom," too, who could listen to an extended and difficult musical composition and then reproduce it note for note on the piano. Other people, reading of such prodigies, are likely to feel discouraged and to exclaim, "I have no memory;" but such a statement cannot be true of any normal human being. The man who had "no memory" would not know his father and mother or recognize his own face in the mirror; he would not realize when he was thirsty that it was water he needed, or that letting the sunlight into a room would banish darkness.

A Definition. Memory is the power which the mind has to revive past experiences and to be conscious of the fact that it has had them before. In the article on HABIT there is a reference to the fact that the nervous system has a tendency, when it has once acted in a certain manner, to act in that same manner again, and memory is but another phase of that same tendency. The second part of the definition above, however, shows the distinguishing feature of memory—the recalling of the past impression must be *conscious.* Sometimes a person, because of some shock or accident, has impressions wiped from his mind as completely as writing is erased from a blackboard. When he starts to readjust himself to life he may find himself possessed of a tendency to do certain things—he may shrink instinctively, for instance, from high places; but if this shrinking does not recall to him the fact that he once fell from such a place, the experience is not in the fullest sense a memory. The same case brings out another interesting distinction. The man has lost his *memories*—that is, he can revive no impressions from his past; but his *memory* may be unharmed. Everything which has happened since his accident he may recall perfectly, and he may be able to learn a poem or master the details of a period of history as well as he ever could.

Memory, Imagination and Recognition. Students of the mental processes—psychologists, we call them—used to believe that memory was a special mental power and had a part of the brain all to itself, but further study has shown that this is not so. It is, instead, connected with every mental process, every feeling, every sense perception. Thus one may remember the taste of an orange, the scent of a jasmine, the sound of the latest popular song, the color of the house in the next block, the train of reasoning by which a certain result was reached, or the grief which a sad announcement awakened.

Two other mental processes are closely related with memory—*imagination* and *recognition;* but there are distinctions. Memory and imagination are alike because both deal with objects which are not present to the senses; the garden seen yesterday is to-day just as nonexistent to the eyes of the one who saw it as is the fanciful Garden of Eden which he amuses himself by imagining. But with the memory of the observed garden there comes a feeling of familiarity—there were trees here, flowers there, a fountain in the center; while in the imaginary picture all is strange and new. It is the sense of familiarity, then, that distinguishes memory from imagination.

This feeling of familiarity recognition has in common with memory, but recognition demands an actual object, present at the time, while memory may deal with something seen once and never to be seen again.

Verbal Memory and Logical Memory. Many a child learns the multiplication table perfectly and can repeat it easily from "two times two are four" to "twelve times twelve are one

hundred forty-four," and yet if he be asked suddenly "How much is seven times nine?" he may be unable to tell until he has run over in his mind the table of sevens. Many a child, too, learns such a poem as Bryant's *Robert of Lincoln,* yet could tell nothing, off-hand, of the appearance and the habits of the bobolink. This is mere mechanical memorizing—"learning by heart," as the children call it—and if too much indulged in is likely to retard the development of the reasoning powers.

In *logical* memory, on the other hand, dependence is placed, not on the power to recall mere words in a certain order, but on the organization and orderly arrangement of ideas. The rules in grammar or arithmetic are remembered, not because "the book says so," but because there is an appreciation of the underlying principles which work out in these rules. The latter form of memory is the higher, but the verbal, or mechanical, memory is by no means to be despised. Sometimes people, just because "learning by heart" is so often abused, affect to scorn a mere "memory for dates," but if properly used this kind of a memory may be of the greatest help. Macaulay, whose extraordinary powers were mentioned above, could never have been the remarkable historian he was had he not had an excellent mechanical memory. He read everything that came to his hand—not just the things which stood on everybody's bookshelves, but obscure historical publications and manuscripts; and years afterward, when in his writing he had need of a certain fact he could not only state it, but tell the volume and often the page whereon the original was to be found. He combined with his verbal memory a logical memory, and the result was unusual mental strength.

On the other hand, mechanical facility sometimes exists as a sort of a freak in minds which have no other element of strength. A person who is little more than half-witted may be able to repeat a number of meaningless syllables or a list of unrelated numbers after hearing them once. Blind Tom, whose marvelous musical memory attracted the attention of the world, was subnormal in other respects.

Helping the Memory. On the whole, the importance of a reliable memory is so obvious, not only during the preparatory years which are spent in school or college, but in the later years of business or home activity, that students have spent much time devising methods of cultivating the memory. The art known as *mnemonics* is a rather formal or mechanical way of assisting the memory. It consists of the formation of various devices or associations which will make recall easy. Almost everyone, for instance, remembers the lengths of the months by means of the little jingle:

> Thirty days has September,
> April, June and November;
> All the rest have thirty-one,
> Excepting February alone,
> Which has but twenty-eight in fine
> Till Leap Year gives it twenty-nine.

And students of history are familiar with the roughly-metrical list of the sovereigns of England which begins—

> First William the Norman, then William his son,
> Henry, Stephen, Henry, then Richard and John.

But of course to remember dates or other facts in this way there must be some actual device connected with each one, and it is often as difficult to recall the device as the thing to be remembered by it. Good memory always depends upon:

Attention. This is one of the primary factors in memory, and no one can have a really good memory who cannot concentrate his attention. Teachers dealing with young people are frequently amazed to find how little they retain of a paragraph read over; and this is usually because the habit of attention has never been cultivated. Closely allied with this is *interest;* anyone is certain to give attention to anything in which he is vitally interested, and the teacher or parent should do all he can to broaden and deepen the interests of the child. See ATTENTION; INTEREST.

Reproduction. Reproduction of what is read is important. The teacher or parent cannot find a more helpful exercise than that of having children give in their own words, either orally or in writing, the substance of something which they have read or studied.

Training all Senses. This brings up another point. Some people remember best what they have seen, some what they have heard; in other words, some people have a *visual,* some an *auditory* memory. But almost always that thing is best remembered which is gained through more than one sense. That is, if a child has heard a poem recited, has read it himself, and perhaps has written it out, he is far more likely to remember it than if he had merely read it. If a pupil seems to remember things only when he has seen them, he should be required occasionally to reproduce something which he has heard read, while the child with the strong auditory memory should be

called upon to repeat what he has himself seen on the printed page.

Memorizing. There has been much argument regarding the value of memorizing, as to whether or not it is really helpful; the conclusion has been reached that all depends on the method employed. If a child sees the reason for memorizing a certain thing, if he understands the content and can, if necessary, give the substance in his own words, memorizing is distinctly beneficial, but a child should never be allowed to commit to memory what is to him wholly meaningless, as this leads to slovenly habits of thought; but in after years we derive great pleasure and benefit from gems of literature memorized in childhood, although at the time they were learned we could not fully understand them. Nor should a child ever be allowed to memorize a lesson and repeat it glibly in the words of the book when the subject is such a one as history, for instance, where it is entirely the content and not the form which is of importance. See PSYCHOLOGY. A.MC C.

Consult Watts' *Economy and Training of Memory;* Meumann's *The Psychology of Learning.*

MEMPHIS, *mem'fis,* an ancient capital of Egypt, about twelve miles south of Cairo. It is said to have been built by Menes, Egypt's first king, as his capital, and that he turned the course of the Nile to make more room for it. Menes named the city Men-nofer, which means *a place of good abode,* but the Greeks corrupted it into Memphis. Owing to its favorable location the city became rich and powerful, and its old palaces are described as being of remarkable beauty. Other classical buildings were the temples of Isis and Ra, the latter being the temple of the Sun. After the fall of Thebes, Memphis became the capital of Egypt, and the second city in the land in population. After the Arab conquest the decline of the city was rapid, and Cairo was partially built of stones taken from the deserted buildings. Nearly all traces of the city had disappeared in the first part of the nineteenth century, only two colossal statues of Rameses II being found on the site which marked the entrance to the temple of Ptah. For location, see map of EGYPT, page 1969.

MEMPHIS, TENN., an important city on the Mississippi River, at the head of deep-water navigation, is the county seat of Shelby County, situated in the extreme southwestern part of the state. It is the largest city in the state and the largest city on the river between New Orleans, 739 miles south, and Saint Louis, 454 miles north. Memphis is growing rapidly; in 1910 the population was 131,105; in 1916 it was 148,995 (Federal estimate). About thirty per cent of the inhabitants are colored.

More than 175 steamers, whose home port is Memphis, ply between Memphis and river and Gulf ports. The Chicago, Rock Island & Pacific, the Frisco, the Illinois Central, the Louisville & Nashville, the Nashville, Chattanooga & Saint Louis, the Saint Louis, Iron Mountain & Southern, the Saint Louis Southwestern, the Southern and the Yazoo & Mississippi railroads enter two large passenger terminals, the Union and Grand Central stations. Freight transfer within the city is effected by two belt lines. A great iron cantilever bridge, the only one across the river from the Gulf to the mouth of the Ohio, was completed in 1892 at a cost of $3,000,000. A second and larger bridge was under construction in 1917.

Memphis has an area of twenty square miles. It is situated on the east side of the river, on an elevation known as Chickasaw Bluff, which is forty feet above high water. A wide levee extends along the river front. The city is made attractive by wide, well-paved and well-shaded streets and fine residences and public buildings.

Parks and Public Buildings. There are 1,200 acres in woodland parks, a fairgrounds of 111 acres and two race courses. Overton Park (335 acres), which has the Brooks Memorial Art Gallery and Zoölogical Gardens, Riverside (427 acres) and other parks are connected by boulevards and parkways. In the center of the business section is Court Square, in which is a bust of Andrew Jackson. The prominent buildings are the customhouse and post office, erected in 1885 at a cost of $1,500,000; the courthouse, containing also the city offices, costing $1,500,000; the police headquarters, which cost $250,000; the Cotton Exchange and the Merchants' Exchange; Cossitt and two other public libraries, and a market house.

Institutions. Memphis has the West Tennessee State Normal School, the medical department of the University of Tennessee, Goodwin Institute and two schools for negroes, the Hannibal Medical College and Le Moyne Normal Institute. There are, besides, many private schools. Other important institutions are the Baptist Memorial Hospital, one of the finest in the South, the United States Marine and the Municipal hospitals.

Commerce and Industry. The commercial and industrial importance of Memphis is due

to its year-round deep-water navigation and its location in a rich cotton and lumber belt. As the largest interior cotton market of the United States, and one of the largest in the world, it handles more than 1,000,000 bales annually. It is also one of the largest hardwood lumber markets, producing one billion feet a year, a great cottonseed-oil producing center, and one of the most important mule and horse markets of the South. There are three stockyards and a meat-packing house. Extensive wholesale houses annually distribute more than $24,000,000 worth of groceries, foodstuffs, clothing and drugs.

Among more than 600 manufacturing establishments are wood-working factories; foundries and car shops; machine shops; cooperage, fiber, pulp and paper mills; rice mills; harness factories; engine and boiler works, and manufactories of cotton gins, pottery, stoves, ranges and cider presses.

History. The earliest explorers found Chickasaw Indians on and about what is now the site of Memphis. Here they lit their council fires and embarked to cross the river. During the seventeenth century the place was visited by Marquette and Joliet, La Salle and De Tonti. In 1739 the first French fort was built, but throughout the eighteenth century the Spanish contested the French claim to the lower Mississippi. In 1797 Fort Adams was built by United States troops, and soon after the Indians were expelled. General Andrew Jackson, Judge John Overton and General James Winchester, owners of the property, organized a small settlement in 1819, which was incorporated as a town in 1826 and received a city charter in 1849.

Epidemics of yellow fever in 1855, 1867, 1873, 1878 and 1879, during which time thousands died and thousands more fled for safety, so impoverished the city that to avoid bankruptcy the state legislature, in 1879, repealed the city charter and created the Municipal Taxing District of Shelby County. A complete system of sanitation was installed, the indebtedness was bonded, and in 1893 the city charter and name were restored. The city water supply is obtained from artesian wells owned and operated by the municipality. In 1909 the commission form of government was adopted. J.M.T.

Consult Young's *History of Memphis.*

MEMPHREMAGOG, *mem fre ma' gog,* a picturesque small lake on the boundary between Canada and the United States, about one-third of its area being in the state of Vermont and the remainder in the province of Quebec. It is about thirty miles long from north to south and from two to five miles wide. Memphremagog is noted for its attractive scenery and its excellent fishing, and its shores are dotted with summer resorts and private villas. Newport, Vt., at the southern end, and Magog, Quebec, at the northern, are the principal settlements. Through the Magog River the lake discharges northeastward into the Saint Francis River, which reaches the Saint Lawrence at Lake Saint Peter.

MENDELSSOHN-BARTHOLDY, Jakob Ludwig Felix (1809-1847), commonly called Felix Mendelssohn, a famous composer, was born at Hamburg, Germany. His parents were converted from the Jewish to the Christian faith when Felix was but two or three years old, and he himself was baptized in the Lutheran Church. The family was wealthy and cultured, and there was never a day in Mendelssohn's life that he lacked those things which money and broad education could give. When he was two years old Hamburg was captured by France, then at war with Germany, and the Mendelssohn family fled to Berlin, a city which he never liked, but which he always considered his home.

He began to receive music lessons from his mother. when he was but four years old, and five years later was composing short pieces for the family orchestra, consisting of his brother, two sisters and himself. When he was sixteen the family moved to a beautiful mansion in Berlin with a seven-acre park about it, and there in a garden-house seating several hundred people concerts were held that were the admiration of the whole city. In the course of time thousands of visitors from many parts of the world attended these entertainments, and the photographs sent by distinguished persons who had enjoyed the music filled forty-seven volumes.

MENDELSSOHN

When the boy was but fifteen years of age he composed and directed a three-act opera of such beauty that the most crabbed musician in Berlin, called, for his spitefulness, "Old

Zelter," arose in the audience and compared him to Haydn, Mozart and Bach. Mendelssohn's father then sent him on a three-year tour of Europe to gain ideas from other musicians. He went first to London, where he played his *Symphony in C,* written when he was but fifteen, and so pleased the audience that many people leaped upon the stage to congratulate him. In June of that same year, 1829, he played in London the overture of his *Midsummer Night's Dream,* written before his seventeenth birthday, and again the audience showed extraordinary enthusiasm. In later years he gradually added musical settings for the various scenes in the famous Shakespearean drama until the entire play was described in music. It is in this composition that the famous *Wedding March* is to be found.

When he was twenty-four years old he was appointed director of public music for Düsseldorf, Germany, but two years later removed to Leipzig to direct the public concerts. He was greatly admired by the music-loving citizens; the university of the city conferred upon him the honorary degree of doctor of philosophy; he suggested and organized the famous Leipzig Conservatory, the greatest music school in the world. Life indeed seemed full of profitable and pleasant work for him. In 1835, however, he suffered a severe loss in the death of his father, and his sorrow caused him to compose *Saint Paul,* one of the greatest of oratorios. Mendelssohn, though still very young, was beginning to show signs of premature old age; overwork had made him irritable, and the unappreciative attitude of his home city, Berlin, increased his natural sensitiveness. But there seemed to be no decrease in either the quantity or quality of his compositions. In 1840 he was commissioned by the Leipzig authorities to compose the music for the four hundredth anniversary of the invention of printing, and the result was his marvelous *Hymn of Praise,* excelled perhaps only by Beethoven's *Ninth Symphony.* Because of this work he was chosen general superintendent of sacred music throughout the kingdom of Prussia. In 1845 he resigned all positions to devote his entire time to composing, and near the close of that year finished his most famous work, the oratorio *Elijah.* It was first presented at Birmingham, England, on May 26, 1846, and gained a reception never equaled in the history of oratorio music.

In the midst of such triumphs came the death of his beloved sister Fanny, and in his stricken condition he wrote the pathetic *Violin Quartet in F Minor,* probably the most sorrowful composition in all music. His grief seemed to increase, and in October, 1847, caused a stroke of apoplexy. He lingered until November 4, when his death occurred at Leipzig. Memorial services for the beloved musician were held in practically every large city of both Europe and America. R.D.M.

Consult Rockstro's *Mendelssohn,* in Great Musicians Series; Hadden's *Life of Mendelssohn.*

MENDICANT, *men'di kant,* **ORDERS,** communities of religious men who renounce all worldly possessions and accept the vows of poverty, chastity and obedience. Though the term *mendicant* is associated with begging, it was not the original idea of the founders of the Orders that they should subsist by alms, but by manual labor, and resort to solicitation only when labor became impossible. With the growth of cities and communities, spiritual ministrations increased, self-support by personal work became difficult and the dependence upon contributions of the faithful increased. Subsequently, however, the practice of receiving alms declined or was abolished. These Orders were instituted in the thirteenth century and have spread steadily throughout the West, where they have responded to the religious, intellectual and artistic needs of society by founding colleges and institutions of learning. The Dominicans, the Franciscans, the Augustinians, the Carmelites and the Servites are the most prominent of this class of Orders.

MENDOZA, *men do'sah,* the most important inland city of Argentina, South America, and capital of the province of the same name, is beautifully situated at an elevation of 2,500 feet above sea level, 160 miles east of Valparaiso, in a rich agricultural district in the northern part of the province. Mendoza is the center of the grape and wine industry of Argentina, 100,000 acres of vines being cultivated in the vicinity. It is also the transfer point between Buenos Aires, 647 miles to the east, and the Pacific coast. Connection with Chile is obtained by the Trans-Andean Railway. The city is progressive, having schools, colleges, banks and beautiful public buildings. It was visited by an earthquake in 1861, when 10,000 lives were lost. Population, 1915, about 62,000.

MENELAUS, *men e la'us,* a character in Greek mythology, who was a son of Atreus, brother of Agamemnon and husband of the beautiful Helen of Troy. The happy married life of Menelaus and his wife came to a sudden

end when Paris, the son of Priam, king of Troy, visited them, fell in love with Helen and persuaded her to elope with him to Troy. Menelaus, aided by the Greek chieftains, sought revenge; thus came about the famous Trojan War. After ten years he recovered Helen and started back to Sparta with her, but the two had displeased the gods and were in consequence driven by storms to other shores. At last they reached their native land safely. There they took up their reign and "lived happily ever after." See HELEN OF TROY; TROY.

MENHADEN, *men ha'd'n,* or **MOSS'-BUNKER,** a salt-water fish, from twelve to eighteen inches long, which has received possibly more variations in name than any other fish in American waters. Among its numerous names are *yellow-tail, bunker* and *pogy.* In color it is bluish above, and silvery on the sides. It may be found from Nova Scotia to Brazil, and is by far the most abundant fish on the eastern coast of the United States. As a food fish for the table the menhaden is not so highly valued; but its flesh is packed in oil, after the manner of sardines, for domestic and foreign consumption, and salted menhaden is also found on the market. As a source of valuable oil it is of great commercial importance, and from the part left after the oil has been extracted a fertilizer is manufactured. It is also unexcelled as a bait fish in the cod, halibut and mackerel fisheries. These fish swim near the surface in unwieldy masses, and all the large fishes feed upon them, the tunny being the most destructive.

MENINGITIS, *men in ji' tis,* a general term for a number of serious maladies characterized by inflammation of the membranes covering the brain and the spinal cord. Of the different forms the most appalling is *cerebrospinal meningitis,* an infectious disease that has occurred as an epidemic at various times in Europe and America. *Cerebral* meningitis is acute inflammation of a membrane of the brain (the *pia mater*), and occurs in two forms—tubercular and simple, of which the former is more common to children than adults. *Spinal* meningitis affects the membranes of the spinal cord. All forms are very dangerous and often result fatally. See BRAIN.

Epidemic Cerebrospinal Meningitis, inflammation of both the brain and the spinal membranes, is caused by a specific germ which has been found in secretions of the nose, eye, bronchial tubes and joints, and in the blood. The winter and spring months are the most common seasons for epidemic outbreaks, and the disease claims the greatest number of victims in squalid tenement districts, where dark, narrow alleys and sunless rooms offer favorable conditions for the spread of the infection. Crowded, insanitary barracks occupied by soldiers, and famine-infested districts are other favorite breeding-grounds of the germ. This kind of meningitis is especially prevalent among children. In its worst form it attacks its victims very suddenly, and death often results in a few hours.

The germ works its way into the membranes, setting up a violent inflammation. Almost unendurable pains rack the head, and every nerve becomes abnormally active, making the surface of the body sensitive to the lightest touch. The body often breaks out in an eruption of dark, purplish spots, whence the name "spotted fever." The muscles contract and become rigid, drawing the head and neck backward and sometimes almost doubling the spine upon itself. Wild delirium accompanies these symptoms, which are followed by coma, paralysis, and in most cases by death. Until the discovery of the meningitis serum (see subhead below), doctors could do no more than administer soothing drugs, such as morphine, and endeavor to allay the anguish of the sufferer by applying ice caps to the head. Often recovery was more to be dreaded than death itself, for blindness, deafness, imbecility and paralysis were common after-effects.

Flexner's Serum. In 1905, when an appalling epidemic of cerebrospinal meningitis was at its height in New York City, Dr. Simon Flexner was appointed a special commissioner by the Rockefeller Institute of Medical Research to investigate the cause of the disease. He proved the existence of a specific germ, which had been isolated in 1887 by a German investigator named Weichselbaum, and after a long series of experiments he succeeded in producing a serum which has been used with remarkable results. Formerly seventy-five per cent of the victims of this type of meningitis died, while now but twenty-five per cent succumb. Furthermore, those who recover are spared the dreaded after-effects that once made death welcome. Before the discovery of the serum the disease was fatal to nine-tenths of baby victims under two years of age. This high average has been reduced to about fifty per cent, while only 15.9 per cent of the children between five and ten die. W.A.E.

Consult Mohler's *Cerebrospinal Meningitis.*

MENNONITES, *men'on ites,* a Protestant denomination or sect founded in Zurich, Switzerland, in 1525, the name being derived from that of Menno Simons, who preached in Friesland, in Netherlands. The first Mennonite settlement in the United States was made by immigrants from Holland, who, induced by the offer of religious liberty made by William Penn, settled at Lancaster, Pa., in 1683. Since 1871 large numbers of Mennonite immigrants from Southern Russia have settled in Dakota, Kansas, Minnesota and Canada. The Church membership is represented in about seventeen states of the Union and in Ontario and the western provinces of Canada, the greater number being in Ohio and Pennsylvania. The total number of communicants is about 57,000, with 736 churches and 1,400 ministers. The Church of the Mennonite Brethren of Christ was formed in 1880, being the latest organization of the body of Mennonites, which is now divided among twelve Church branches, which differ somewhat in discipline, doctrine and ritual.

Consult Krehbiel's *Mennonites in North Ameriea.*

MENOMINEE, *me nom'i nee,* the name of a tribe of North American Indians. The word means *wild rice men.* They belong to the Algonquian stock and resemble the Ojibways, but have a distinct language of their own. Their home formerly was in Wisconsin and Northern Michigan, and they were found by Nicolet in 1634 at the mouth of the Menominee River. The French established a mission among them in 1670, but during the Revolutionary War and the War of 1812 they aided the English. They now live on a reservation near Green Bay, Wis., and number about 1,600.

MENOMINEE, Mich., one of the most important ports on the Great Lakes for the shipment of lumber. It is the county seat of Menominee County, and is situated in the southernmost corner of the Upper Peninsula, and on Green Bay, at the point where it receives the waters of the Menominee River. The city of Green Bay is fifty miles southwest, and Milwaukee is 165 miles south. Marinette, Wis., is on the opposite bank of the river, here spanned by three bridges. Transportation is provided by the Chicago, Milwaukee & Saint Paul, the Chicago & North Western and the Wisconsin & Michigan railroads, and steamers connect with other lake ports. Menominee is a terminus for the car ferries of the Ann Arbor Railroad.

The location of the city in an extensive lumber region makes the sawing and shipping of lumber the principal industry, and there are manufactories of lumber in all forms. In addition there are factories for making machinery, paper, shoes, beet sugar and stained glass, and packing houses and canneries. Menominee has well-kept parks, fine schools, a public library and museum, the county buildings, Saint Joseph's Hospital and the county agricultural college.

The first settlement was made in 1799 by Louis Chappieu, a French fur trader, and was named for the Menominee Indians, a tribe of the Algonquians. The growth of the place began with the building of the first lumber mill here in 1832; in 1883 the city was incorporated. In 1910 the population was 10,507, and it remained practically stationary thereafter. The area of the city exceeds four square miles.

MENSURATION, *men shoo ra'shun,* treats of the measurement of lines, surfaces and solids. A surface has two dimensions, length and width, and its extent is known as its *area.* Area is expressed in square units. Solids, or bodies with three dimensions, may be measured for volume, which is expressed in cubic units. The measurement of surfaces is made clear by a study of the rectangle, a plane figure having four sides and four right angles. It is the simplest form of plant surface.

The Rectangle. The rectangle represented by Fig. 1 is 12 units long and 4 units wide, and contains 48 square units. There are 12 square units in each row, and there are 4 rows. Looking at it from one *end,* there are 4 square units

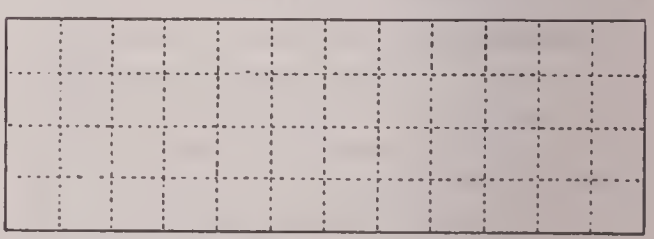


FIG. 1

in one row, and there are 12 rows. If each square represents a square inch, the area of the rectangle is 48 square inches. If each square represents a square foot, the area is 48 square feet.

To find the area of a rectangle (1) *Express the length and the width in the same unit of linear measure, inch, foot, yard, etc.;* for example, the length is 8 feet and the width is 12 feet.

(2) *Multiply the number of units of length by the number of units of width. The product is the number of square units in the rectangle. These square units correspond to the linear units used in expressing the length and width;* for example,

(1) Length = 8 ft.
Width = 12 ft.
Area in sq. ft. = $8 \times 12 = 96$
(2) Length = 14 mi.
Width = 20 mi.
Area in sq. mi. = $14 \times 20 = 280$
(3) Length = 12½ yd.
Width = 6 yd.
Area in sq. yd. = $6 \times 12\frac{1}{2} = 75$

In school or at home the child learning area should do much real measuring of surfaces; should draw to represent these surfaces, and divide into square units—square inches, square feet and square yards—to realize that the surface of the rectangle is as many square units as the product of the numbers denoting the length and the width (study the article RECTANGLE in connection with this subject).

In general, to find areas of other plane surfaces we compare them with the rectangle.

The Parallelogram. A parallelogram is a plane figure having its opposite sides parallel. The rectangle is a parallelogram, but there are other parallelograms whose angles are not right angles (see Fig. 2).

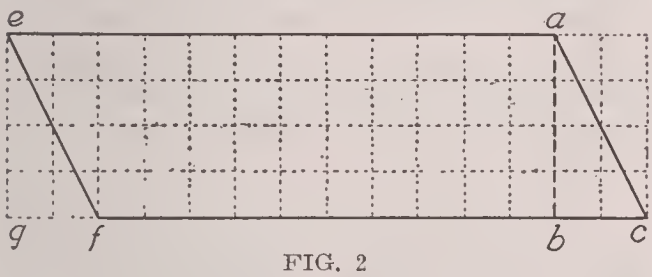


FIG. 2

The base of this parallelogram is 12 units, and its altitude or width is 4 units (note heavy dotted line). See how this may be made into a rectangle by cutting off *a b c*, and fitting it on at *e f g*. Make a drawing, and do this. It is now a rectangle whose length is 12 units and whose width is 4 units, and so has an area of 48 square units.

The area of a parallelogram is the same as the area of a rectangle of the same length and width. (Note the width is the perpendicular distance between the sides.)

Triangle. A figure bounded by three straight lines is a triangle (see Fig. 3, I and II).

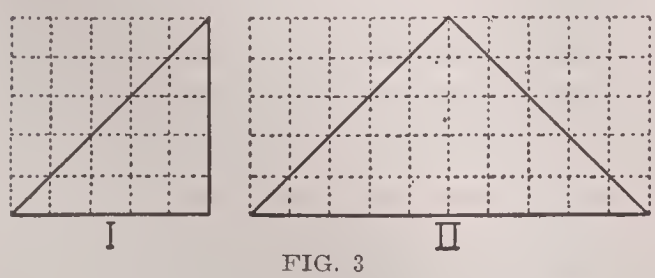


FIG. 3

Examine Fig. 3, I. See that it is half the rectangle in which it is drawn. Now study II, and see how it could be made into a rectangle. The area of I is one-half the area of the rectangle, or $\frac{5 \times 5}{2}$ squares, or 12½ squares. The area of II is equal to the area of a rectangle whose base is 5 and altitude 5, that is, whose base is one-half the base of the triangle, and whose altitude is the same as that of the triangle. In other words, its area is one-half the area of the rectangle in which it is drawn.

Draw several triangles and by cutting and arranging see how each compares with the area of a rectangle of the same base and altitude.

The area of a triangle equals one-half the area of a rectangle of the same dimensions; or, *The area of a triangle equals one-half the product of its base and altitude.* This rule may be expressed in the three following mathematical statements:

$$\text{Area of triangle} = \frac{\text{Base} \times \text{Altitude}}{2}$$

$$\text{Area of triangle} = B \times \frac{A}{2}$$

$$\text{Area of triangle} = A \times \frac{B}{2}$$

How many triangular samples of cloth, each having a 6-inch base and 4-inch altitude, can be cut from a piece of cloth 18 inches long and 4 inches wide?

$$\text{Number} = \frac{18}{6} \times 2 = 6$$

Show this by a drawing and cutting. Can you draw and cut in another way? (Study the article TRIANGLE in connection with this subject.)

Trapezoid. A trapezoid has two of its sides parallel (called the bases) and two sides that are not parallel (see Fig. 4, I and II). The

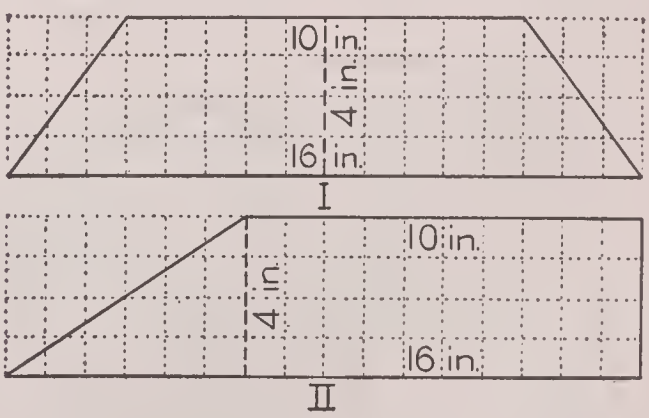


FIG. 4

altitude is the distance between the bases, as shown by the heavy dotted lines in each figure. Examine I and see how it can be made into a rectangle 13 inches long and 4 inches wide. Draw and cut to show this. Look at II and see that it can be made into a rectangle 13 inches long and 4 inches wide.

The area of a trapezoid is equal to that of a rectangle whose base is one-half the sum of the bases of the trapezoid, and whose altitude is the same as that of the trapezoid. Put in another form: *To find the area of a trapezoid, multiply one-half the sum of the bases by the altitude.*

1. Find the area of a trapezoidal piece of gold leaf, one base 6 inches, the other base 4 inches and the altitude 3 inches.

Base = 6 in.
Base = 4 in.
Average base = $\left(\frac{4+6}{2}\right)$ in. = 5 in.
Altitude = 3 in.
Area in sq. in. = $3 \times 5 = 15$

Draw this trapezoid. Make of it a rectangle 5 inches by 5 inches.

2. A farmer has a field in the form of a trapezoid. The east boundary line is 40 rods; the west boundary line, which is parallel to the east line, is 60 rods. The distance between these boundaries is 80 rods. How many acres does the field contain?

Base = 60 rd.
Base = 40 rd.
Altitude = 80 rd.
Average base = $\frac{60+40}{2}$ rd. = 50 rd.

$$\text{Number of acres} = \frac{50 \times \overset{1}{\cancel{80}}}{\underset{2}{\cancel{160}}} = 25$$

General Problems in Surface. 1. What is the cost of plastering a room 16 feet by 14 feet, and 9 feet high, at $.50 per square yard?

$$\text{Number sq. yd. in walls} = \frac{16 \times \overset{1}{\cancel{9}} \times 2}{\underset{1}{\cancel{9}}} + \frac{14 \times \overset{1}{\cancel{9}} \times 2}{\underset{1}{\cancel{9}}} = 60$$

$$\text{Number sq. yd. in ceiling} = \frac{16 \times 14}{9} = \frac{224}{9} = 24\tfrac{8}{9}$$

Cost = $85 \times \$.50 = \$42.50$

Allowance is made for openings in walls to be plastered in some localities. Sometimes the *entire* surface of the openings is deducted, sometimes *one-half* the surface, and at times *no deduction* is made. It is interesting and good for the students and teacher to know the *local rules* in matters of this kind. Always use the *nearest whole number* of square yards; for example, 12¼ is called 12, while 12¾ is called 13.

2. What will it cost to lay a concrete floor in a milk house 54 feet long and 20 feet wide, at $.95 per square yard?

$$\text{Number of sq. yd.} = \frac{\overset{6}{\cancel{54}} \times 20}{\underset{1}{\cancel{9}}} = 120$$

Cost = $120 \times \$.95 = \$114.00$

3. A roof is 30 feet long, 18 feet wide. If 9 shingles cover a square foot, and shingles sell at $5 per thousand, what will the shingles for the roof cost?

Number of shingles needed = $30 \times 18 \times 9 = 4860$
Cost = $4.860 \times \$5 = \$24.30$
Practical cost = $5 \times \$5 = \$25.00$

Shingles come in bunches of 250 each, and one must purchase a bunch even though he needs only a fraction of a bunch.

4. A farm along the Illinois River consists of a rectangular piece of land 1 mile long and ½ mile wide, and a triangular piece with a base of ¼ mile, and an altitude of ½ mile. There is an assessment on the farm for drainage of $52 per acre. What is the assessment?

Area of rectangle in acres = $1 \times ½ \times 640 = 320$
Area of triangle in acres = ½ of $(¼ \times ½) \times 640 = 40$
Assessment = $360 \times \$52 = \$18720$

Note that the rectangular field contains ½ a square mile, and as there are 640 acres in 1 square mile, the field contains ½ of that, or 320 acres. The triangle contains ½ the product of its base and altitude, or ½ of ⅛ square mile, or 1/16 square mile, or 40 acres.

Circle. For area of circle, see CIRCLE. In connection with mensuration refer to and study QUADRILATERAL; SQUARE; POLYGON; RHOMBUS; TRIANGLE, and so on. Also see DENOMINATE NUMBERS.

Volumes. Some units for measuring volume are the cubic inch, the cubic foot, the cubic yard. The subject of volume measurements is fully treated in these volumes in the article CUBIC MEASURE. A.H.

Related Subjects. A more detailed knowledge of this subject in its various phases may be gained from the following articles in these volumes:

Angle	Prism
Area	Pyramid
Arithmetic	Quadrilateral
Circle	Rectangle
Cone	Rhombus
Cube	Sphere
Cube Root	Square
Cubic Measure	Square Measure
Cylinder	Trapezium
Geometry	Triangle
Polygon	Weights and Measures

MENTAL HANDICAPS. Physical and mental handicaps, or disorders, are always closely related, for anything which interferes with the health of the body is sure, directly or indirectly, to influence the health of the mind. On the other hand, many, if not most, mental disorders react on the body. A truly sound mind in an unsound body is hardly possible, although it is of course true that occasionally a man or

woman of great ability does struggle along with a feeble body. Yet even in such instances the individual is not living up to anything like his highest possible efficiency. As a matter of fact, hardly anybody lives up to his highest possible efficiency by probably twenty-five to fifty per cent. And if this is true of the average "well person," what must we say of the one who is definitely and plainly handicapped?

Let us first consider what the common mental disabilities of children are; next, what they mean; and finally, what can be done about them. For our present purposes these may be grouped in the following way:

1. Special mental deficiencies, or shortages occurring in otherwise normal children.
2. Backwardness or dullness, producing slow progress in school but not necessarily interfering with a reasonably successful life.
3. Backwardness of a serious nature, involving more or less mental deficiency of a permanent nature, and interfering with a successful life.
4. Juvenile insanity of a temporary or permanent nature.
5. Unstable mental states (psychic inferiority), producing many kinds of troubles, often of a moral nature.

Special Deficiencies, or Shortages. Probably all of us come under this class to some extent, for no one is perfectly developed in mental equipment. But when a child is definitely and obviously "short" in some particular, he easily becomes a "misfit" in school and is in great danger of becoming a "misfit" in life. If a child does well in most things but very poorly in one or two others, there is some good reason for his shortcoming, and this reason may usually be discovered if we make a careful attempt, along lines now available. Such children are usually "born short" in some definite line, and in so far as we can see at present there is not much that can be done about the matter.

Some children have very little capacity for mathematics, beyond the fundamental operations of adding, subtracting, multiplying and dividing, and the solution of concrete problems. Some have as little capacity for spelling, or for music or rhythmic movements, while others show no aptitude for manual training, drawing, or mechanical work of any kind. Some possess singularly small ability for languages, some have no artistic sense, and so the list might be continued almost indefinitely.

Such children can, of course, make a certain amount of progress along the lines of their deficiencies, but beyond a point of very moderate success they do not pass. Industry and patience and diligence up to a certain degree make a difference, and lead to some improvement, but beyond this very moderate degree of achievement these qualities do not help much, and, indeed, often hinder, for they lead nowhere and expend energy which might be more successfully directed into different channels.

Teachers and parents ought to help a school child to decide when he has reached his probable limit of mental development in certain directions. This is to-day one of the greatest educational problems we have to solve, but the means for its solution are already within our hands, and it is not nearly so hard a matter as at first might seem. Modern vocational guidance must be based upon this principle of the early discovery of capacity for learning.

To progress we must all meet with a fair degree of success in our efforts, for effort without reasonable success dwarfs the soul, mind and body. In the main we succeed best in those things which we like best and which we can do with a fair amount of ease. It appears that one may be just as truly "short" in mathematical as in color sense, yet no one is ever particularly blamed for being quite color blind. The inability to succeed in mathematics may be due to a deficiency in the power of imagery, especially if it involves complex pictures. And some other mental incapacities may be explained, at least in part, by innate differences in the power to form mental pictures.

It is convenient to be born right-handed, but nobody claims that it is really necessary for a successful and happy life. And it is not really any more necessary to have mathematical sense or language sense in a high degree, than it is to have musical sense or artistic sense. Sometime, perhaps, psychologists and educators will learn how to develop these various shortages which trouble many children to-day, but until they do it would seem wiser to apply the same common sense to them that we do to the other things of life which we have learned are not absolutely essential to success.

Of course it is perfectly plain that if a child or an adult is short in several things, he is a mentally deficient person, but if he is only short in one or two particulars, and still averages up well, he is really not mentally deficient at all, and may indeed be a very superior sort of person.

Fortunately, to succeed in life it is not necessary to know all school subjects equally well, but the practical point is that we must select our life work along those lines where our shortages are of little or no importance *to us*. The

color-blind person cannot expect to be an artist, nor the tone-deaf person a musician; neither can the man or woman who lacks language sense expect to succeed as a linguist. There are plenty of fields of endeavor, however, that are open to all of us who possess average intelligence, and a definite shortage in one or two directions, while it may sometimes be an inconvenience (just as left-handedness is), is, after all, nothing more than that.

The practical lesson from all this is—learn to know yourself as early as possible: learn your special aptitudes and your special inaptitudes, and adjust yourself to life so that you can progress with the least possible amount of friction.

Dr. Luther Gulick makes this very clear when he says in his book, *The Efficient Life:*

> There are conditions for each individual under which he can do the most and the best work. It is his business to ascertain those conditions and to comply with them.

And Dr. David Starr Jordan expresses the same idea in a little different way when he says:

> The best subjects for anyone to study are those best fitted for his own individual development, those which will help make the actual most of him and his life.

The Slow but Not Defective Child. Many children of this class are found in the schools. Sometimes their slowness is caused by physical conditions, such as adenoids; poor nutrition, either from improper food or from certain diseases, such as malaria and hookworm. Other physical causes are insufficient sleep, or sleep in badly-ventilated rooms, excessive coffee drinking, and drinking of wine and beer, sometimes a habit of certain children of foreign parentage. But while some cases of slowness are no doubt produced by physical defects or diseases, or bad habits of living, most cases are *innate,* that is, the child is born this way. This does not mean that such children may not succeed in the world. It only means that they are not educable to a very high degree, in the ordinary meaning of education to-day, and must be content with some of the humbler stations of life.

Schools often make the mistake of attempting to develop children or young people of this class beyond the limit of their natural mental capacities. Trade schools are nearly always well adapted to the type of child whose educational capacity is rather limited, although this does not mean that such schools may not be adapted to other types as well. There should be no sense of disgrace attached to the slow child, for while he may be slow along certain educational lines, he is often very competent in the practical affairs of life.

A dull lawyer, for example, might make a very superior carpenter, or a slow teacher a very excellent mechanic. What we need to do in the schools is to help pupils to find themselves just as early as possible. Tests of mental capacity along different lines have been developed by psychologists which might now be easily applied to children and young people in the way of definite vocational guidance.

Mentally Deficient Children. A good many backward children are now known to be permanently deficient in intelligence to such an extent that they cannot develop beyond a certain definite mental age. For example, a child of fourteen years may be retarded in the fourth grade. Here he seems to remain indefinitely. Now a psychological examination sometimes shows that such a child actually possesses only the intelligence of children of the fourth grade, that is, about nine or ten years. Under these conditions there is very little reason to hope for any greater development of intellect.

The child is permanently arrested in mental growth. All we can do about it is to give such a child the best education his intellect will accept rather than to hope and strive for that which is sure to be a disappointment later in life.

Since 1905, when Binet, a French psychologist, and Simon, a French physician, developed their "intelligence seals" for measuring the intelligence of children in terms of mental age, great progress has been made in the study of children of this type and also of adults who have never passed a child stage of mental development. Investigators in this field now hold that from one to two per cent of the children in our public schools are mentally arrested, or, as we say, feeble-minded. It often happens that outwardly such children give no indication whatever of their mental state. Sometimes they have quite a fine personal appearance.

Without the Binet-Simon and other well-known psychological tests many of these cases could never be understood by either parents or teachers. Because of this mental arrest such individuals pass into adult life with very little *judgment* or will power. It now appears that many criminals (probably about fifty per cent), large numbers of paupers, many juvenile-court cases, and other people who form our most serious social problems belong to the medium

or high-grade feeble-minded class, or what are now called "morons."

We are learning that one of the best ways to prevent crime, destitution, and many of the results of degeneracy, is to detect the feeble-minded cases while they are still in school, and to place them under the supervision of some one who can safeguard them through life. Some of them need to be placed in public institutions, others can be cared for when understood outside of institutions. Under proper guidance most of this class can learn to be self-supporting. Without such guidance they become wards of society and furnish our most serious social problems. Left to themselves, as they have been in the past, they will continue to swell the ranks of the worthless, simply because their intelligence does not furnish them with the judgment necessary to get along in our complex life of to-day.

Juvenile Insanity. Not much need be said in this place about insanity in children of the school age, as this is strictly a medical rather than an educational problem. Insanity at this age is very uncommon, and about the only form that does occur is what is known as *dementia praecox,* or insanity of the young.

This sometimes makes its appearance in the child of late school age or of high school or college student age. Indications particularly to be observed as pointing in this direction are: dreamy states, a tendency to dream rather than to act; such individuals usually being self-centered, impractical, egotistic. They lack practical application in meeting real problems of life and drift into superficial ways of thinking and acting. They often have high ideals which they are never forceful enough to put into effect. The mental deterioration is usually very gradual but constant. Finally, under some strain, the insanity becomes obvious.

To some extent insanity is *preventable,* and all tendencies to chronic dreamy states, mental inactivity, superficial moralizing without action and failure to meet practical difficulties should be severely discouraged. Nothing is more important than the formation of habits of getting things done promptly and efficiently. The habit of substituting dreamy, self-deceptive ideas and hazy moralizing in place of healthy activity is demoralizing to character formation and a successful life.

Psychic Inferiority. There are some individuals who, while they are neither insane nor feeble-minded, still fail to meet life successfully. They are often nervous, irritable, suggestible, emotional and selfish. They easily "fall into antisocial conduct."

Some of these persons are wanderers or are runaways; some steal, others lie, cheat, or have bad sex habits which they cannot control. These and many other characteristics are found which render the individual antisocial and keep him and his relatives in constant trouble. Many of these inferiors in later life become addicted to the use of alcohol and various drugs. Heredity plays a very important part here, and a bad family history is often discovered on inquiry. Sometimes certain diseases, such as meningitis contracted early in life, seem responsible for the condition.

Many of these cases need control in some institution. Very few if any ever reform and become truly useful members of society. Many of the confirmed criminals are of this type. Such individuals should never be permitted to become parents. See EDUCATION, subtitle *Hygiene of Education;* LIFE EXTENSION. E.B.H.

MEN'TOR, one who gives wise counsel or advice, especially to a younger person; a faithful friend. The way in which this word came to have its present meaning is interesting. According to ancient legend, when Ulysses went from his home to fight in the Trojan War he left his little son, Telemachus, in the care of Mentor, who was really the goddess Minerva in disguise. Mentor proved to be such an excellent guardian that his name, meaning *friendly adviser,* has come to be a word in common use. See ULYSSES.

MEPHISTOPHELES, *mef is tof' e leez,* the devil in Goethe's drama *Faust,* which is based on the medieval legend of a Dr. Faustus who sold his soul to the Evil One in return for twenty-four years of the latter's services. Mephistopheles, a badly-composed word from the Greek, means *not a lover of light.* The old medieval Mephistopheles is a melancholy, sorrowing fellow who would be an angel and tries not to be any worse than he must; but Goethe has invested the character with intellect and a sense of humor. His Mephistopheles really enjoys being Satanic, and has much sport with his victims and their useless struggle to be good. In the opera *Faust* the rôle of Mephistopheles is sung and acted by the leading basso.

MERCATOR, *mer ka' ter,* or *mer kah' tawr,* GERARD (1512-1594), a Flemish geographer. He was born at Rupelmonde, studied at the University of Louvain, and after his graduation continued his studies in mathematics and geography. He wrote and edited various works on his favor-

ite science, and constructed globes showing the heavens and the earth, but he is remembered chiefly for his invention of the so-called "Mercator's projection" used in map drawing. In maps drawn by this system the meridians and parallels are represented as vertical and horizontal lines, respectively, crossing each other at right angles. This projection does not lead to great distortion in maps of countries near the equator, but when applied to large areas it results in a disproportionate widening of lands or seas distant from the equator. See MAP.

MERCERIZING, *mer'ser ize ing,* a chemical process used in the treatment of cotton fabrics, whereby a lustrous silky effect is obtained. The system was patented in 1850 by John Mercer of Lancashire, England, from whom it derives its name. Mercer discovered that caustic soda or caustic potash changed the nature of cotton fiber, making it shrink and become softer and thicker, and causing it to take the dye more readily, but no practical use was made of the discovery at that time, on account of the excessive shrinkage of material. Later it was found that by treating the cloth under tension the shrinkage was avoided and the familiar, silky appearance was obtained. In the process of mercerizing the cloth the fibers are changed from flattened, spiral tubes to straight translucent ones, and the lustrous effect is due to the reflection of light from the smooth surface of the fabric. Mercerized fabrics assume more brilliant colors in dyeing than materials which have not been so treated, and the best cotton, Egyptian or Sea Island, attains the highest luster.

MERCHANT MARINE, *ma reen'.* The seas are the great highways through which intercourse between the widely-separated nations of the world takes place. The instrument by which this international intercourse or trade is carried on is the merchant marine. This is the name given to the total number of commerce-carrying ships a country possesses. History has shown that those nations, or, in ancient times, those cities, that possessed a large merchant marine not only increased rapidly in wealth but also attained great political power.

British Merchant Marine. It was during the reign of Queen Elizabeth that England, the greatest maritime power to-day, entered earnestly upon the task of building up a merchant marine and of founding a vast colonial empire. Among the most important measures that have helped to establish British sea supremacy were the navigation acts enacted by Oliver Cromwell, especially that of 1661. It is reckoned that at that time the merchant marine of all the European nations amounted to about 2,000,000 tons, of which nearly half belonged to the Dutch, who possessed the largest; about 500,000 tons were English. From that time onward England forged ahead and outdistanced all rivals, gaining the naval supremacy the British now enjoy.

England possessed in 1914 a merchant marine that had a tonnage of over 21,500,000 tons out of a total tonnage of 49,250,000 tons of shipping owned by all the countries in the world, including England. The United States occupied second rank, with a merchant marine of 8,389,000 tons, but this includes the ships engaged in coastwise trade and the vessels that ply on the Great Lakes (see subheading, below). The German submarine campaign, entered upon with great violence in the early part of 1917, in the most desperate phase of the War of the Nations, sank close to 1,000,000 tons of vessels a month, the greater part British.

The Merchant Marine of Germany. The second largest merchant marine engaged in overseas trade in 1914 was that possessed by Germany; it amounted to 5,082,000 tons. This was less than a quarter of the tonnage possessed by England. The German merchant marine grew from a very small beginning to its present size since 1870. It was a splendid example of what an energetic people can accomplish when properly encouraged by its government through subsidies, railway rates and other means. It was by the aid of its merchant marine that Germany built up an extensive foreign trade which nothing of less magnitude than the great War of the Nations could effect. That struggle, due to the blockade of German coast waters, made its merchant marine ineffective.

The Merchant Marine of the United States. The whole merchant marine of the United States which was engaged in oversea trade in 1914 had a tonnage of 1,998,450 tons. This ranked the United States as having the smallest oversea merchant marine of any of the great commercial nations. Before the War of the Nations the foreign commerce of the United States, imports and exports, amounted to about 4,000 million dollars a year; after the outbreak of the war this total greatly increased, but only about ten per cent of its foreign trade was carried in American ships, the remainder being transported in foreign vessels. In 1917, after the United States joined the allies in the great war, plans were at once prepared to increase the

tonnage by building over a thousand new vessels.

The merchant marine of the United States has not always occupied a low position. Before the proclamation of independence the American colonies had a large merchant marine, and the tonnage of ships owned in New York, Boston and Philadelphia was greater than that owned in London, Liverpool or Glasgow. The prominent part these American merchantmen played in the successful naval battles of the American Revolution is a part of history. It is reckoned that at the beginning of the nineteenth century the American merchant marine was second in the world, amounting to about 970,000 tons, which represented about half the tonnage owned by England. This merchant marine grew steadily, until just before the outbreak of the War of Secession the United States had a merchant marine engaged in foreign trade amounting to 2,300,000 tons, as compared with 3,082,000 tons owned by England. The total merchant marine of the United States, including vessels engaged in the coastwise trade, and those on the Great Lakes, aggregated 5,354,000 tons, while that of England was only 4,252,000 tons. The War of Secession dealt the merchant marine of the United States a blow from which it is still suffering. Another cause of the decline was the substitution of iron for wood in the building of ships, which took place at that time. This gave a great advantage to England. There iron could be manufactured more cheaply than in the United States at that period.

IN 1914

The merchant marine strength of the five greatest carrying nations is shown above, the sizes of the flags representing comparative tonnage. (*a*) England; (*b*) Germany; (*c*) Norway; (*d*) France; (*e*) United States.

The Coastwise Shipping of the United States. Transportation by water between the different parts of a country is called the *coastwise trade*. The laws of the United States provide that only ships built or owned in that country are allowed to engage in coastwise trade. While the American oversea merchant marine has greatly declined, the coastwise shipping has grown to large proportions. The Panama Canal stimulated still more its growth. The shipping engaged in the coastwise trade is over 7,000,000 tons, and of this total ships with a tonnage of nearly 3,000,000 tons ply on the Great Lakes. It is a matter of note that the tonnage of the ships navigating the Great Lakes has nearly doubled since 1900. It is now larger than the merchant marine of any foreign nation except England and Germany.

Shipping Subsidies. In order to build up a national merchant marine many foreign governments grant bounties for the construction of ships, and pay to these ships certain sums of money during the time they are operated. Such help is called *shipping subsidies*. The United States government has never granted such assistance. The only help granted to American shipowners is in the form of so-called postal subventions. In accordance with a law passed in 1891, which is still in force, the Postmaster-General makes contracts with American shipowners for carrying the mails between the United States and foreign ports. For this service the shipowners are paid a certain sum of money, which is in proportion to the size of the steamer and its speed. The contracts are made for a period of five to ten years and are awarded to the lowest bidder.

There has been for many years past an agitation in favor of granting shipping subsidies by the United States government as the best means to create a merchant marine adequate to the needs of the foreign trade of the country. Bills for that purpose have been introduced in Congress several times, but none has become a law. Public opinion has been either lukewarm on the subject or opposed to such a measure. The shortage of shipping tonnage created by the War of the Nations demonstrated the disadvantages resulting to the trade of the country from the lack of an adequate merchant marine. With the merchant marines of Germany, Austria-Hungary and Turkey driven from the seas, with the ships lost by the allies through mines and submarines, and with the remainder of the

allied ships either used for military purposes or taken away from their usual trade channels, there resulted a great scarcity of ships for carrying on the trade of the world. It was America's opportunity, but facilities were lacking.

Recent Developments. In order to relieve the situation created by the scarcity of ships Congress passed a measure to make it easier for foreign-built ships to register in the American merchant marine. This measure had the effect of transferring in 1915 to the American flag over 523,000 tons of shipping which belonged to other nations. The lack of ships had also the effect of greatly increasing the output of American shipbuilding yards, for during the fiscal years ending June 30, 1915, and June 30, 1916, 1,266 vessels of 215,711 tons and 1,030 vessels of 347,847 tons were built in the United States. O.B.

Consult Hough's *Ocean Traffic and Trade;* Meeker's *History of Shipping Subsidies.*

MERCIER, *mer sya',* Honoré (1840-1894), a Canadian barrister and statesman, premier of Quebec from 1887 to 1891, a bold defender of provincial rights and of the Roman Catholic Church. For years he was the idol of the French-Canadians. He was born at Sainte Athanase, was educated at the Jesuit College of Saint Mary at Montreal, and in 1865 was admitted to the bar. While studying law he also edited the *Courrier de Saint Hyacinthe,* one of the leading Liberal papers in Quebec. Unlike most of the Liberals, however, Mercier opposed Confederation on the ground that the French-Canadians would lose their distinctive position and political power.

In 1871 the more aggressive of the French-Canadians organized the Quebec Nationalists for the purpose of asserting what they believed to be their political and religious rights. One of the founders of the party was Mercier. He was a member of the Dominion House of Commons from 1872 to 1874, and in 1879 became solicitor-general of Quebec. In Quebec politics his policy involved an intimate alliance with the Roman Catholic Church, an alliance which became more open after he was elected leader of the Quebec Liberals in 1883. Two years later the execution of Louis Riel brought under Mercier's leadership all the sympathizers who looked on Riel as a martyr. In 1887 Mercier became premier of Quebec, and for the next four years he was the storm center of Canadian politics. At his direction the provincial assembly incorporated the Jesuits and also passed a law compensating them for the estates which had been confiscated by the government years before. These laws aroused a bitter demand in other parts of the Dominion for disallowance, but the House of Commons decided that Mercier's course was within his rights. His services to the Church were recognized in 1891 by Pope Leo XIII, who made him a Count. In the same year charges of misuse of public funds, in connection with the construction of the Baie de Chaleur Railway, were brought against him, and compelled the resignation of his ministry. At the ensuing elections Mercier was reëlected to the assembly, but the party was defeated. Though personally innocent, Mercier's political influence was broken by the scandal.

MERCURY, *mer'kuri,* or **QUICK'SILVER,** the metal used for filling thermometer and barometer tubes, and the only metal that remains a liquid at ordinary temperatures. Mercury is a silver-white metal, over 13.5 times heavier than water; it flows freely, and when spilled is not easily recovered. Because of these peculiarities the Greeks gave it the name *hydrargyrum,* which means *water silver,* and the Romans named it after the messenger god. Mercury freezes and becomes solid at 37.9° F. below zero and boils at 675° F., changing to a vapor. When heated or cooled it expands or contracts quickly and at a very regular rate; that is, an equal amount for each degree of temperature. For this reason it is especially valuable for thermometers. It combines with a number of metals to form *amalgams* (see Amalgam).

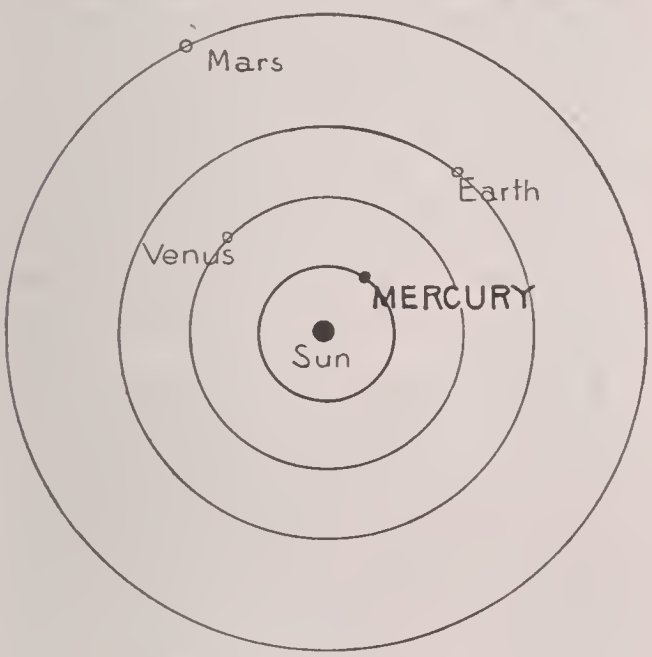
Its most extensive use is for extracting gold and silver from ores. The powdered ore mixed with water is run over copper plates covered with a thin layer of mercury. The mercury combines with the gold or silver, forming an amalgam, while the rocky or earthy material of the ore is washed away, leaving the gold or silver free (see Gold; Metallurgy). When the amalgam is heated, the mercury distills off. There are a number of compounds of mercury used in the arts. It unites with oxygen to form a red oxide, used in laboratory experiments. A compound with chlorine (mercurous chloride) is extensively used as a medicine under the name of *calomel.* Another compound with chlorine, *mercuric chloride,* is the well-known and exceedingly poisonous *corrosive sublimate,* often used as an antiseptic and sometimes swallowed by people, with fatal results (see Antidote). *Mercuric sulphide,* or *cinnabar,* occurs in red crystals and is the chief source of mercury. *Vermilion,* another compound with sulphur, is used in some red paints. Nearly all

compounds of mercury are very poisonous, and none should be used as a medicine except under the direction of a physician.

Mercury is obtained by roasting the ore, cinnabar, in a current of air. This heating process drives off the sulphur, which combines with oxygen of the air to form a gas, thus leaving the mercury free. Spain, Mexico and the United States produce most of the world's supply. The chief mines in the United States are near the city of San Francisco. J.F.S.

For the best-known uses of mercury, see BAROMETER; THERMOMETER. Consult Lindgren's *Mineral Deposits.*

MERCURY, the smallest of the planets and the nearest to the sun. It was named for Mercury, the swift-footed mythological messenger of the gods. Less is known about Mercury than about any other of the planets, for its nearness



MERCURY'S POSITION
Orbit of Mercury and of the other minor planets.

to the sun makes it difficult to observe. When an evening star, Mercury is seen to advantage in the eastern sky soon after sunset. The Greeks called Mercury Apollo when it was visible in the morning, and Mercury when it was an evening star.

Magnitude of Mercury. The planet has a diameter of about 3,000 miles, somewhat more than one-third of that of the earth; its surface is about one-seventh and its volume about one-eighteenth that of the earth. Its density is not so great as that of the earth, and the gravity on its surface is about one-third of the force of gravity on the earth's surface; a man weighing 150 pounds on earth would weigh about fifty pounds on the planet Mercury. As Mercury has no satellite with which to compare it, measurements given can only be regarded as approximate, and not exact, as in the case of other planets.

Rotation of the Planet. It was for a time understood that Mercury rotated on its axis once in 24 hours, 5 minutes, 28 seconds, but this has been proved incorrect. It revolves in its orbit round the sun in eighty-eight days, and it rotates on its own axis only once during that period, keeping the same face always towards the sun, as the moon does towards the earth. Some astronomers, however, refuse to accept this statement of rotation, adhering to the principle of daily rotation. The average distance of Mercury from the sun is 36,000,000 miles, but its orbit is so eccentric that the distance varies from 28,500,000 miles, nearest distance, to 43,500,000 miles as the greatest distance. The synodic period of the planet, that is, the time taken to travel from conjunction to conjunction, is 116 days.

Transits of Mercury. At intervals of from three to thirteen years the planet Mercury passes across the sun's disk between sun and earth, and becomes visible as a small black spot against the sun. Such transits usually occur in the months of May and November, the latter month having almost twice as many as the former. The last transit visible in the United States was at 8 A.M., November 7, 1914; the next transit will occur in May, 1924. Transits are always carefully observed by astronomers, as they yield valuable information.

Light and Atmosphere. The reflecting power *(albedo)* of Mercury is much below that of the other planets and is inferior to that of the moon. Such atmosphere as Mercury possesses cannot be as dense as that of Venus or the earth. Transits of Venus show by a circle of light surrounding the dark mass against the sun that it has an atmosphere, but in transits of Mercury this light circle is not seen. It is known, however, that water exists in the planet's atmosphere. Revolving in its orbit, Mercury presents to the people of the earth exactly the same phases or positions as the moon,—the crescent, the full moon and the half moon. The surface of the planet receives nearly seven times as much heat and light as is received in the same area on earth, and it has at least two seasons annually. Seen through a telescope the surface of Mercury is not as interesting as the other planets. The disk is brighter at the edge than in the center, but little can be seen of value as a guide to study of the nature and formation of the planet. F.ST.A.

Related Subjects. For illustration of comparative sizes of the planets, see PLANET. Reference is suggested, also, to the following articles in these volumes:

Astronomy	Moon
Conjunction	Planet

MERCURY, an important deity in classical mythology, who served as the messenger of the gods, and particularly of Jupiter, whose son he was. He presided over eloquence and was the patron of orators and merchants, and also of dishonest persons, thieves and robbers; besides, he ruled over roads and conducted the souls of the dead to Hades. From his birth he was most remarkable, for before noon of the first day of his life he had invented the lyre, and by evening had stolen the cattle of Admetus, which Apollo was tending, and had hidden them. Forced to admit his guilt and to restore the cattle, he confessed that he had eaten ten of them, and in payment he offered Apollo his lyre. The sun god was so pleased with the gift that he gave Mercury in exchange the caduceus (see illustration).

MERCURY
The statue by Bologna, in the National Museum, Florence.

Mercury was a great favorite with the gods, because of his pranks as well as of his wit and intelligence. Jupiter gave him a winged cap and winged sandals and a short, scythelike sword, and by means of these he performed many wonders as the spy and servant of the king of gods. It was he who fixed Ixion to his revolving wheel, who slew the giant Argus, conducted Priam to the tent of Achilles, carried Bacchus to the nymphs, sold Hercules to Omphale and brought Proserpina back from the underworld. His festival was celebrated by Roman merchants on the thirteenth of May, in a temple near the Circus Maximus. The best-known representation of Mercury in art is the bronze statue by Bologna, which shows the god with his winged cap, winged sandals and caduceus; he is poised on one foot, as though about to spring into the air, and one hand is raised, pointing upward. See MYTHOLOGY, and the characters named above.

MERCURY, BICHLORIDE OF. See CORROSIVE SUBLIMATE.

MERCY, SISTERS OF, a name frequently applied to religious societies of women, whose mission is to nurse the sick, to visit the prisoner, to protect women in distress and to educate females. Their work in time of pestilence and plague is well known. The name is specifically applied to the Order of Our Lady of Mercy, a Roman Catholic organization founded in Dublin, in 1827, by Miss Catherine McAuley, who became its first mother superior. The first house of the Order in North America was established in Pittsburgh, Pa., in 1843, and now there are communities of these sisters widely distributed throughout the United States, Europe and Australia. They have no general superior, and are subject to the bishop. The habit is a long, flowing black robe, with long, loose sleeves, and a white hood with white or black veil, the last-named being replaced by a bonnet for street wear. G.W.M.

MER DE GLACE, *glahs,* the name of a celebrated Alpine glacier which has a greater velocity than any other glacier in the Alps Mountains. Its rate of movement is 35.5 inches a day. This sea of ice is situated on the northern slope of Mont Blanc; it has an area of sixteen square miles and a length of about nine miles. It is noted for beautiful surrounding scenery, and is easily reached by tourists from the village of Chamouni. Most sightseers especially wish to view the solitary rock, or oasis, called *Le Jardin,* seven acres in extent and covered with beautiful foliage, which lies in the upper part of the glacier. The lower end is known as the Glacier des Blois, where it flows into the Arveyron River, in the valley of Chamouni. See GLACIER.

MER'EDITH, GEORGE (1828-1909), an English novelist, one of the last eminent figures of the group of fiction writers who made the Victorian Era glorious in English literature. Meredith's first novel, *The Ordeal of Richard Feverel,* by many regarded his greatest achievement, was published in 1859, the year in which George Eliot's *Adam Bede* appeared. It was not until a quarter of a century later, however, when *Diana of the Crossways* was written

(1885), that his power as a novelist received general recognition. Like his contemporary Browning, he was given to condensing the thought of an entire paragraph into a single sentence or a phrase, and this style of writing, together with his tendency to analyze his characters and to study them from the viewpoint of psychology, kept him from enjoying the popularity that Dickens and Thackeray enjoyed. Thoughtful readers, however, rank him among the foremost novelists of his generation.

Meredith was born in Portsmouth, where his father was engaged in the naval-outfitting business. He was educated in England and in Germany, and for a brief period studied law. When he was twenty-one his first poem, *Chillian-Wallah,* was published, and two years later, in 1851, a volume of *Poems* appeared. Then followed *The Shaving of Shagpat,* an Arabian fantasy (1855), and four years later the masterpiece of his early period, *Richard Feverel.* None of his later efforts surpassed this book in descriptive power, imagination, humor, tenderness and insight into character. The tragic outcome of the story represents Meredith's belief that a novel should have a logical conclusion, that it should portray life as it is.

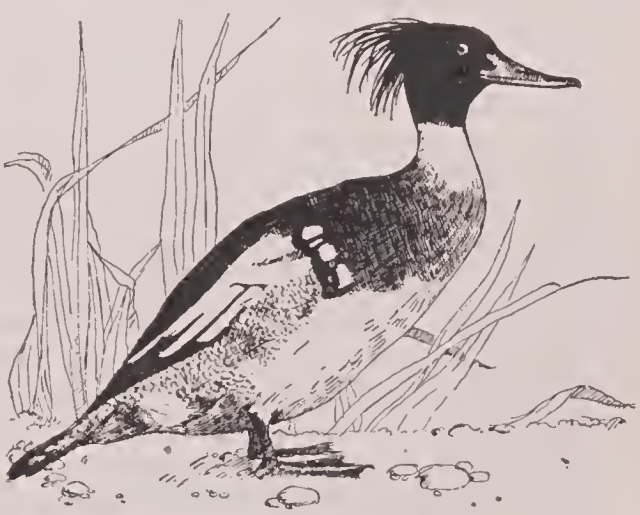
During thirty years of his long career he acted as literary adviser to a large publishing house, and was the means of encouraging many young writers by his helpful criticism. When Tennyson died, in 1892, his place as president of the British Society of Authors was filled by Meredith, and the latter's seventieth and eightieth birthdays were observed by some of the most eminent writers of the day. Four years before his death, in 1905, he received from King Edward VII the Order of Merit.

Among his most important novels, aside from those mentioned, are *The Egoist, Evan Harrington, Sandra Belloni, Rhoda Fleming, The Adventures of Harry Richmond, Beauchamp's Career* and *The Amazing Marriage.* His poetry, like his novels, requires too much thought of the reader to be widely popular, but much of his verse is of an exceedingly high order. *Modern Love* should be read for its wonderful rhythm and word painting. It is probably the author's best achievement in verse. B.M.W.

MEREDITH, Sir William Ralph (1840-), a Canadian statesman and jurist, chief justice of Ontario since 1912. Sir William is one of the most distinguished and most respected of the members of the Canadian bench. The list of offices he has held is helpful, but by no means completely indicates the universal respect in which he is held, not merely for his technical knowledge of the law but for the wide range of his knowledge and his sympathies. Legislation in the interests of workingmen has especially aroused his interest, but all progressive legislation has won his support.

Sir William was born in Middlesex County, Ontario. He went to school at London, Ont., and later attended the University of Toronto. In 1861 he was called to the bar, and until 1894, when he was elevated to the bench, remained in active practice. Political life also attracted him, with the result that he sat in the Ontario assembly from 1872 to 1894. For the larger part of this period, from 1878 to 1894, he was leader of the Conservative opposition. In 1894 he was appointed chief justice of the court of common pleas for Ontario, and in 1912 was appointed chief justice of the supreme court, with the title of chief justice of Ontario. He was given the honor of knighthood in 1896 and in 1900 was elected chancellor of the University of Toronto.

MERGAN'SER, a family of fishing ducks, commonly called *sawbills,* of which there are three groups, the *American merganser, red-breasted merganser* and *hooded merganser.* These birds are distinguished by their long, saw-



RED-BREASTED MERGANSER

toothed bills, the edges of which are notched to enable them to keep hold of their slippery prey. The experienced housewife will never purchase sawbilled duck for the table, because the flesh of these fish-eating birds is rank and unpalatable. The American merganser, known also as *goosander, shelldrake, weaser,* and by various other names, is a North American resident which nests from Minnesota northward, preferring the waterways north of the Canadian border. It is about twenty-three inches long, and has a small crest of feathers on its head. Its

handsome coat is a combination of glossy greenish-black, salmon-buff, gray and white. In its nest, built of leaves, grasses and moss, and lined with down from the duck's own breast, are laid from six to ten creamy-buff eggs.

The *red-breasted merganser,* as its name indicates, is distinguished by its cinnamon-red breast. This bird nests from Illinois as far north as the Arctic Circle, and in winter is found in Cuba. Its cousin, the *hooded merganser,* wears a handsome black crest on its head, and two crescent-shaped bands of black on the sides of its breast. This bird, which is of more leisurely habits than its two relatives, is fond of still waters and peaceful lakes. It nests throughout its range, from Cuba and Mexico to the far northern part of the continent. The mergansers live about fifty years. See DUCK.

MÉRIDA, *ma're thah,* the capital of the state of Yucatan, Mexico, noted especially for having the largest trade in sisal hemp in the world; the quantity exported annually to America alone is 2,000,000 pounds. A railway connects it with its port, Progreso, on the Gulf of Mexico, about twenty-six miles distant. It was founded in 1542 by Francisco de Montejo, and has numerous institutions and public buildings, many cathedrals and a university. There are manufactories of cigars, cotton goods, panama hats, etc., but the surrounding country is almost exclusively devoted to the hemp industry. Population, 1910, 62,440.

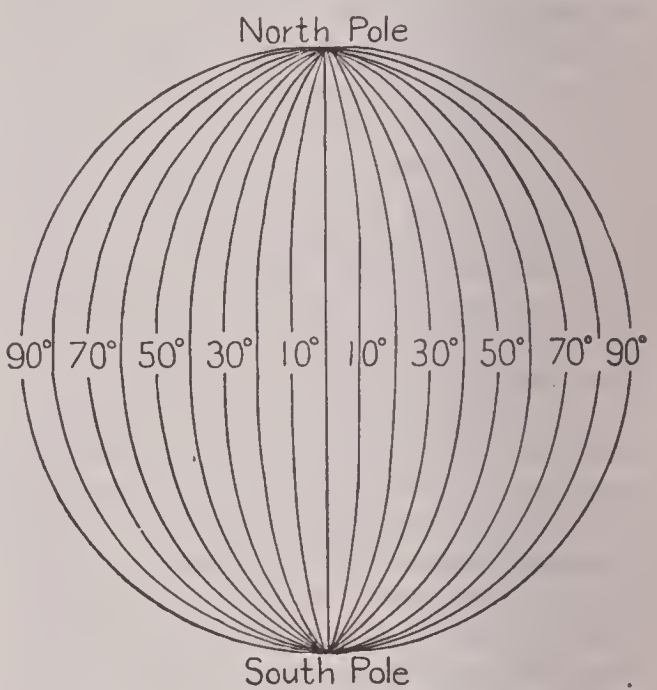
MER'IDEN, CONN., a city in New Haven County, southwest of the center of the state, eighteen miles south and west of Hartford and the same distance northeast of New Haven. It is on the New York, New Haven & Hartford Railroad and on interurban electric lines. The population, which in 1910 was 27,265, was 29,130 in 1916 (Federal estimate). In the same year Meriden town was credited with 34,183.

Meriden covers an area of nearly four square miles, and is situated on uneven ground drained by Harbor Brook, which runs through the town. To the north is Hubbard Park, a reservation of 900 acres; among its picturesque features are three elevations known as the Hanging Hills, which rise to 1,000 feet. Lake Merimere and Castle Craig are other places of interest. Prominent buildings and institutions include the Federal building, the state armory, Curtis Memorial Library, Meriden Hospital, Connecticut School for Boys (reformatory), the Curtis Home for Orphan Children and Aged Women and a tuberculosis sanatorium.

Meriden is called the *Silver City,* because of its extensive manufactures of electroplated and solid silverware. It also has manufactories of hardware, cutlery, glassware, cut glass, brass and bronze goods, firearms, organs, self-playing attachments for pianos and organs, optical instruments, electrical goods and novelties.

Meriden was settled about 1670 and was originally a part of the parish of Wallingford. It became a separate township in 1806 and received a city charter in 1867.

MERIDIAN, *me rid'i an,* in geography, any imaginary line drawn around the earth at right angles to the equator and passing through the north and south poles. There is a meridian for every place on the globe, and when the sun



MERIDIANS SHOWN TEN DEGREES APART

reaches that line it is midday at that place. In order to find the distance of a place east or west of any certain point, men saw that there must be some fixed line from which to measure. In 1884, at a meeting held in Washington, D. C., it was decided to establish a line passing through the observatory at Greenwich, near London, as a starting point, to call it the *prime meridian,* and to reckon distances east or west from it up to 180°, a degree at the equator being equal to about sixty-nine and one-fifth miles. There is also a prime meridian in the Western hemisphere through the city of Washington, but it is little used. The *longitude* of a place is its distance—usually stated in degrees, minutes and seconds—east or west of the meridian selected as a starting point. Distance north or south of the equator is termed *latitude.* See LONGITUDE; LATITUDE.

MERIDIAN, Miss., an important cotton market, one of the leading manufacturing centers of the state and the county seat of Lauderdale County. It is situated near the eastern state line, about midway between its northern and southern borders, eighty-five miles east of Jackson, the state capital, and 135 miles northwest of Mobile. The Alabama & Vicksburg, the Alabama Great Southern, the Meridian & Memphis, the New Orleans & Northeastern, the Southern and the Mobile & Ohio railroads enter the city. In 1910 the population was 23,285; in 1916 it was 21,818 (Federal estimate) The area of the city is four square miles.

Meridian is located in a fine agricultural district, noted especially for an abundance of cotton, and the leading industrial establishments of the city are largely dependent on this product. They are cotton gins, cotton compresses and cottonseed-oil refineries; besides these there are fertilizer, broom, hosiery and wagon factories, lumber and stave mills and large railroad machine shops. The high school building, the Carnegie Library and the courthouse are worthy of note. The East Mississippi Hospital for the Insane is located here. For higher education the city has Meridian Female College (Methodist Episcopal), opened in 1869; Meridian Male College, Meridian Academy (Methodist Episcopal South), and Lincoln School (Congregational), for colored students.

Meridian was organized in 1854 and was chartered as a city in 1860. In 1906 fire visited the city and destroyed a large portion of the business district. In 1912 the commission form of government was adopted.

MERIMÉE, *ma re ma',* Prosper (1803-1870), a French novelist, historian and dramatist, whose name will live because he wrote *Carmen,* a Spanish gypsy romance, afterward woven into one of the most popular operas by Bizet. He was born in Paris, studied law, but cared little for it, and in 1831 became an inspector of historical monuments in France, his reports being the basis of four volumes which included *Monuments Historiques,* a standard work on archaeology. As a writer of both narrative and dramatic fiction, however, he is best known. His first works, *La Guzla* and *Theatre de Clara Gazul,* were translations of Illyrian songs and Spanish comedies. *Colomba,* published in 1840, was a story of Corsica, and a novel of extraordinary power. *Carmen* was written in 1847. In 1853 he became a senator of France and in 1860 was made commander of the Legion of Honor. He had few equals in his day as a master of style, and in private life was characterized by loyal and devoted friendships. See Carmen.

MERLIN, *mur'lin,* a magician, bard and prophet of British legend, who was supposed to have been the son of a fierce demon and a Welsh princess. When he was yet an infant he began to show his marvelous powers. During the time of the Saxon invasion he invoked two dragons out of the ground, supposed to represent the Saxons and the Britons. As they fought he sang a series of verses in which he predicted the future down to the time of Geoffrey of Monmouth (twelfth century). The story of Merlin was written in Spanish, French, German and English; he is a character in Sir Thomas Malory's *Morte d' Arthur* and in Tennyson's *Idylls of the King.*

A real Merlin is supposed to have lived about 470. He was a Welsh bard, and during the invasion of the Saxons came into the service of King Arthur. After witnessing a horrible battle near Solway he went mad, and forsaking human society lived in caves, singing to himself all day long.

MER'MAID AND MER'MAN, in folklore, mythical creatures who lived in the sea and possessed bodies that were half human and half fish. Mermaids were supposed to wed mortal men, and mortal maids were often enticed by mermen to the sea. The typical mermaid was represented as a beautiful maiden who combed her luxuriant hair with one hand and held a mirror with the other. The figures of both mermaid and merman are frequently found in ancient and medieval art. The origin of the myth is supposed to rest in the humanlike appearance of certain marine animals, such as the seal. Stories of these mythical creatures have been often celebrated in poetry. Tennyson in his *Mermaid* says:

> I would be a mermaid fair;
> I would sing to myself the whole of the day;
> With a comb of pearl I would comb my hair;
> And still as I combed I would sing and say,
> "Who is it loves me? who loves not me?"

MEROVINGIANS, *mer o vin' je anz,* the name given to the first Frankish kings who governed Gaul and laid the foundations of the French nation. The name was from that of *Merovaeus,* an early chieftain of the race. The first powerful king of the dynasty was Clovis, his ambition being to erect a kingdom on the ruins of Roman power. In A. D. 486 he attacked Syagrius, the Roman governor of Gaul, and gained such a decisive victory that Roman

authority was forever destroyed in that region. Clovis then extended his authority and brought under his power the various Teutonic tribes who inhabited Gaul. His dominions were divided among his four sons on his death in A. D. 511. The Merovingian rulers ultimately became so enfeebled that they were called the "do-nothing" kings, and after a century and a half of government they were pushed aside by an ambitious officer of the Crown, and a new royal line called the *Carolingian* was established. See CLOVIS; CAROLINGIANS.

MERRIMAC, *mer'i mak,* **RIVER,** a river in New Hampshire and Massachusetts, the great water power of which has caused the development of four manufacturing centers, Lowell and Lawrence in Massachusetts, and Manchester and Concord in New Hampshire. The Merrimac, whose name is an Indian word meaning *swift water,* is formed by the union of two streams, the Winnepesaukee and Pemigewasset, which flow together at Franklin, N. H. For sixty miles through New Hampshire the river follows a southward course; then, just south of the Massachusetts boundary, it turns to the east, emptying into the Atlantic Ocean at Newburyport, about 110 miles from Franklin. In this distance it falls 269 feet, and there are steep waterfalls at six points on its course. It drains an area of about 4,550 square miles, and is navigable from Haverhill, Mass., about seventeen miles above its mouth.

MERRY DEL VAL, *mer're del vahl',* RAFAEL (1865-), a Roman Catholic cardinal and secretary of the congregation of the Holy Office. He was born of Spanish parents in London and educated at Ushaw College in Durham, and also in Rome. He took orders in 1888 and became a favorite of Pope Leo XIII, who made him prelate of the Papal household in 1897. He visited England on the occasions of Queen Victoria's jubilee and King Edward's coronation as Papal envoy or representative, and was also sent to Canada on an educational mission. In 1903 he succeeded Cardinal Rampolla as Papal secretary of state, and while holding this office was criticized for adopting a strong policy of aggression. He was created cardinal in November, 1903. Upon the accession of Pope Benedict XV in September, 1914, Cardinal Ferrata succeeded him as secretary of state, and a month later he was appointed as secretary of the congregation of the Holy Office, now chiefly occupied in the suppression of heretical books. His book on *The Truth of the Papal Claims* appeared in 1909.

MERSEY, *mer'si,* a river in the northwestern part of England which is one of the world's most important commercial waterways. It is formed by the junction of the Goyt and the Etherow, and in its length of seventy miles drains an area of 1,600 square miles. Its general direction is southwest, to Runcorn, where it expands into an estuary three miles in width. The great city of Liverpool developed here, and now has a water area of docks and basins of over 400 acres, while the Birkenhead docks, opposite Liverpool, cover 165 acres. Great warehouses are built for storing merchandise, and an immense revenue is derived from tonnage rates on ships. There is some shipbuilding, and the Birkenhead docks are an important center for corn-milling, importation of cattle and export trade to the East. The Manchester Ship Canal, which practically converted that city into a seaport, joins the Mersey at Eastman Locks. Since 1886 a railway tunnel under the river has afforded added communication between the cities of Birkenhead and Liverpool. See LIVERPOOL.

MERTHYR TYDFIL, *mur'thur tid'vil,* a city in the southern part of Wales, on the River Taff, the center of the iron trade of South Wales. It gets its name from Saint Tydfil, who was martyred by the Saxons, *Merthyr* being Welsh for *martyr.* Although it is very old, having been a village on the Roman highway from Cardiff, Merthyr Tydfil was of no especial importance till 1850. Since then its iron and steel industry has made such rapid advance that the town has developed from a country village into a modern commercial city. Besides iron ore, the region produces coal, and Merthyr Tydfil has the largest coal-mining establishments in Wales. Population, 1911, 80,990.

MERV, *merf,* an oasis about 2,000 square miles in area, in the vast plateau desert of Central Asia. Shut in by the Hindu Kush and Herat mountains, on the edge of the desert of Karakoram, Merv has been for centuries the center of industry and population in the plateau region. It is said by the Persians to have been the cradle of the human race. The ruins of an old town, rebuilt by Alexander the Great, the center of Arabic culture in the tenth and eleventh centuries, can still be seen; but the modern town, called New Merv, was founded by the Russians about twenty-five miles west of the old site, after they had captured the oasis from the Turkomans in 1881. Its population is about 12,000; that of the entire oasis, about

120,000. In the neighboring arid regions the wandering Turkomans breed horses which are famed throughout the world.

MESA, *ma'sah,* a Spanish name meaning *table,* applied especially in the western part of the United States to tablelands along the Colorado River and its tributaries in Colorado, Utah, New Mexico and Arizona. These were once parts of plateaus which through a long period of time have been partly worn away by streams, the process being known as *erosion.* Two of the best-known mesas are the Mesa Encantado (the Enchanted), in New Mexico, and the Mesa Verde (the Green), in Colorado. The Acoma Indians believe that their ancestors once lived upon the top of the Enchanted Mesa. On the rocky sides of the Mesa Verde are many ruins of old cliff dwellings, relics of the remote past (see CLIFF DWELLERS). Mesas generally have steep sides because of the action of the streams which left them standing. On the broad, level tops, covered with grasses, desert bushes, mesquite and chico, or greasewood, are often found beautiful lakes. Here were once the best ranges for wild cattle, and at the present time these places afford pasturage for cattle and sheep.

MESHHED, or **MESHED,** *mesh'hed,* the capital of the province of Khorassan, situated in the northeastern part of Persia, about 110 miles from the Afghan frontier. It is noted chiefly for its superb mosque, which contains the sacred shrine of Imam Reza, a descendant of the founder of the Shiites, and which is visited each year by 100,000 pilgrims of this sect. The magnificence of this mosque is scarcely equaled in all Persia. The manufactures of Meshhed, which include rugs, shawls, silks, porcelain and sword blades, are conspicuous for their high degree of excellence. Population, about 60,000.

MES'MER, FRIEDRICH ANTON (1733-1815), a German physician, the first exponent of the theory of animal magnetism. He was born near Constance, in Switzerland. In 1772 he decided that a powerful influence could be exerted by one person over another, and this power he called *animal magnetism.* In 1778 he lectured on the subject in Paris, where he created a sensation and made many converts to his views, although he was regarded as an impostor by regular physicians. He was offered an annual pension of about $4,000 to reveal his secret, but he refused to divulge it. On account of suspicions which arose, a commission from the Academy of Sciences was appointed in 1785 to investigate his discoveries. This commission reported unfavorably to his pretentions, and he fell into disrepute. He then visited England and soon went to Switzerland, where he spent the rest of his life in obscurity at Meersburg. See HYPNOTISM.

MESMERISM, *mes'mer iz'm,* the process by which one person produces in another an unconscious condition resembling sleep, now known popularly as *hypnotism.* The theory was first practiced by Friedrich Mesmer, for whom it is named. See HYPNOTISM, and the subjects there referred to.

MESOPOTAMIA, *mes o po ta'mi a,* a name given by the ancient Greeks to the land encircled by the Tigris and Euphrates rivers, covering an area of about 143,000 square miles. The country, according to tradition, was the first settled home of the patriarchs of the Bible. It is now a part of Turkey in Asia, and its inhabitants include Jews, Armenians, Arabs and Kurds. A number of schools are conducted by English, French, German and American missionaries. Mohammedanism is the established religion, but other religions have a semiofficial recognition. Population about 2,000,000.

LOCATION MAP

MESOZOIC, *mes o zo'ik,* ERA, the great division of geologic time extending from the Paleozoic to the Cenozoic Era. It is divided into the Triassic System, the Jurassic Period and the Cretaceous System, each of which is described under its title. See, also, GEOLOGY; CENOZOIC ERA; PALEOZOIC ERA.

MESQUITE, *mes keet',* a shrub of arid regions, particularly of the Southwestern United States, Mexico, and parts of Western South America. It is also found in the Hawaiian Islands, transplanted by missionaries. Mesquite requires very little moisture, and will grow in deserts too hot and dry for other plants. Those who know the desert know the mesquite; and romance, sometimes overdrawn, is woven about it in stories of desert life.

When it has plenty of water it grows to be a tree fifty or sixty feet in height, with a trunk three feet in diameter. The wood is valuable for building purposes, and for fence posts and fuel. The seeds are good food for cattle and horses. Two kinds of gum are obtained from

the mesquite; one is used in the making of candies, the other by Mexicans as a dye.

MESSENIA, *meh se'ni a,* a peninsula in the southwestern part of Greece. It was the most fertile of the Peloponnesus plains which fell into the hands of the early Dorians. After the second Messenian War, Sparta secured posses-

MESSENIA

sion of Messenia, and until the fourth century B. C. the Messenians were the serfs of the Spartans. In 370 B. C., after Epamonidas, the great statesman of Thebes, marched into Messenia it became an independent state, and a new city, Messene, was founded, its wall going up amid rejoicing in honor of the restored nationality of the people. Two years later a Messenian boy was crowned as victor in the Olympian races; for three hundred years the Messenians had been allowed neither part nor lot in these national games. Messenia's liberation was a blow to the pride of the Spartans as well as to their power and prestige. The independence of the peninsula was maintained until the Romans conquered all Greece in 146 B. C. It is now one of the provinces of modern Greece.

MESSIAH, *meh si'a,* a Jewish term meaning *the anointed one* and corresponding to the Greek word *Christ.* In early Hebrew history any person anointed with holy oil, such as the high priests or kings, was often called messiah. After God promised David that the throne and scepter would remain in his family forever, the title was applied only to those who represented his royal line. But later, when prophecy foretold the coming of a kingly descendant of David, who would always uphold the kingdom, the name was applied to him alone, and since the birth of Jesus, it has always been His title.

The term *Messianic propheey* denotes all prophecy which treats of the person, work and kingdom of Christ, while the term *Messianie times* refers not only to the period when Jesus lived on earth, but also to the whole new era which He introduced.

MESSINA, *meh se'na,* a seaport on the extreme northeastern coast of Sicily, on the strait of the same name. It is seventh among the cities of Italy in commercial importance, exporting oranges, lemons, citron, nuts, wines, pumice stone, silk, linen, coral ornaments and fine damask. In ancient times it was known as *Zanele,* the Greek word for *siekle,* and was so called because its harbor is somewhat sickle-shaped. It is supposed to have been founded in 732 B. C. by pirates from Cumae. The Greeks made it a colony about 500 B. C. and changed the name to Messina.

Messina was the cause of the First Punic War (see PUNIC WARS), at the end of which it came into possession of Rome. After the fall of Rome, it belonged to the Saracens, Normans, Hohenstaufens and Spaniards, and since 1861 has been a part of Italy. Besides being much damaged in the many wars and several earthquakes of ancient times, Messina suffered in the French and Spanish War of 1672-1678, and by plague in 1743. In the disastrous earthquake of 1908 it was totally destroyed, but was at once rebuilt, so the traveler now sees a modern city, on an unusually beautiful bay, at the foot of great rugged hills.

Strait of Messina. This is a stretch of water which separates the island of Sicily from Italy. It is about twenty-four miles long, and at the northern end is not more than two miles wide. It is this narrowest part that the old-time sailors dreaded; they thought it impossible to make the passage because of the rocks of Scylla on one side and the whirlpool of Charybdis on the other. Modern seamen, too, say it is very dangerous because of the depth of the water and the strong tidal current. See SCYLLA.

METALLURGY, *met'al ur ji,* the science and art of separating metals from their ores. It is a most ancient art and of the first importance in the history of civilization. The Trojans knew how to obtain pure silver, and they wrought it into ornaments of intricate and beautiful design. The Greeks, too, were cunning workmen, and the Romans attached such importance to the shaping of metals that Vulcan, the smith, was one of their gods. The alchemists of the Middle Ages were fascinated by their researches in the science and discovered curious facts of the utmost importance, which, however, they lacked the knowledge to interpret properly (see ALCHEMY). In modern times metallurgy has become merged with the science of chemistry, of which it was the forerunner.

Some metals, such as gold, silver and platinum, are found in nuggets or grains in an almost pure state. The surrounding rock is crushed, and the metal is separated by picking or washing in machines (see GOLD; MERCURY). In the case of some other ores, a process known as fusing with a flux is employed. A flux is a substance which will combine with the rocky or metallic envelope of the metal and allow it to be readily melted. The resulting slag is lighter than the molten metal; the latter sinks and can then easily be drawn off at the bottom of the furnace.

Many metals are found combined with sulphur or with oxygen. Among the oxide ores are those of the important metals, iron, manganese and tin. These are freed by heating the ores with carbon (see IRON). Silver, copper, zinc, lead and mercury are commonly made from sulphide ores. The first operation in treating a sulphide ore is usually "roasting." This consists in heating the ore in a current of air. The sulphur combines with the oxygen of the air and is driven off in the form of sulphur dioxide gas. In some instances the metal is left free, as is mercury. In others, the metal, as copper and zinc, is converted into an oxide which is then reduced by smelting with carbon.

Amalgamation. This process is frequently employed in extracting gold and silver. When brought into contact with mercury, the crushed ore readily unites with it, forming an *amalgam*. The mercury is then removed by distillation, leaving the gold or silver in a free state (see MERCURY; GOLD; SILVER).

Another so-called wet process consists in dissolving the gold or silver from the ore by chemical action and then precipitating it (dropping it to the bottom of its receptacle), either by using another chemical or by applying electricity. In one process for the extraction of gold, the solvent used is potassium cyanide; in another it is chlorine. Both of these reagents are extremely poisonous.

Electrolysis. In this process the ore is deposited in a solution of the metal which it is desired to free. The ore is attached to the positive electrode and a plate of similar metal to the negative electrode. When the current is turned on the metal is dissolved from the ore and deposited on the metal plate. This process will be found described in the articles ELECTROTYPING and ELECTROLYSIS. It is advantageous in freeing copper. J.F.S.

Consult Hoffman's *General Metallurgy;* Roberts-Austen's *Introduction to Study of Metallurgy.*

METALS, *met'alz,* one of the two great classes of elements (see CHEMISTRY, subhead *Elements*), or any material resembling these. Metals are usually lustrous, malleable, ductile, strong and good conductors of heat and electricity. The six metals known to the ancients were gold, silver, copper, tin, iron and lead. The alchemists of the Middle Ages recognized mercury as a liquid metal and associated each of the seven metals with one of the heavenly bodies, as follows: gold, the sun (Sol); silver, the moon (Luna); copper, Venus; iron, Mars; tin, Jupiter; lead, Saturn; mercury, Mercury. Modern chemists have discovered many additional metals. Some of these, such as lithium, sodium, potassium, calcium, magnesium and aluminum, are much lighter than those previously known. Others, such as platinum and iridium, are heavier than even gold. Alloys of the metallic elements are also commonly called metals. Among such are brass, bronze, magnatium, bell metal, gun metal, Britannia metal, type metal, etc.

Related Subjects. The following articles in these volumes, most of them dealing with specific metals but a few with more general topics, will be found helpful:

Alloy
Aluminum
Antimony
Arsenic
Babbitt Metal
Barium
Bismuth
Brass
Bronze
Calcium
Chemistry
Chromium
Cobalt
Copper
Copper Glance
Galena
Gallium
Galvanized Iron
German Silver
Gold
Iridium
Iron
Lead
Lithium
Magnesium
Manganese
Mercury
Metallurgy
Minerals and Mineralogy
Nickel
Osmium
Palladium
Platinum
Potassium
Radium
Silver
Sodium
Steel
Strontium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc

METAMORPHIC, *met a mawr'fik,* **ROCKS.** See METAMORPHISM, below.

METAMORPHISM, *met a mawr'fiz'm,* from Greek words meaning *change in form,* is the name given by geologists to changes which rocks have undergone since their formation. The agencies causing these changes are heat, pressure, chemical action and moisture, but heat and pressure are the most important. The changes include:

(1) Hardening of the rock, as in the case of sandstone;

(2) Change in composition and structure, as in slate. Slate was at first mud, then it became shale, and, finally, under the influence of heat and pressure, it was changed into its present form;

(3) Crystallization. The formation of marble from limestone is a good illustration of this change. Under intense heat the limestone was partially melted, and on cooling the particles arranged themselves in crystals, which are readily seen by examining a piece of marble with a magnifying glass.

Rocks have been subjected to heat in two ways; first, by lava, which has been forced up through crevices or thrown out by volcanoes, and, second, by movement of the earth's crust, which is always accompanied by both heat and pressure. See GEOLOGY.

Metamorphic Rocks. Rocks changed by heat and pressure, as described above, are known as *metamorphic rocks.* They differ from igneous rocks in that the latter were formed in the state in which they now exist, while metamorphic rocks have had their characteristics changed by heat and pressure. See IGNEOUS ROCKS.

METAMORPHOSIS, *met a mawr' fo sis.* In studying the life history of certain animals, such as frogs, a great variety of insects, sea urchins and crabs, we find that the little creature which emerges from the egg is wholly unlike the full-grown animal, and that during the process of development striking changes in structure and appearance occur before maturity is reached. This unfolding process is known as *metamorphosis,* a name derived from a Greek word meaning *to transform.* It is nowhere more strikingly illustrated than in the life cycle of the butterfly, whose development is also an example of *complete metamorphosis.* That is, including its existence in the egg, it passes through four stages of growth. The newly-hatched creature is known as a *larva,* and the first stage of development after its emergence from the egg is the *larval period.*

The Larval Butterfly. The larva of the butterfly is a crawling, fuzzy caterpillar, brown, yellow or white in color, or a huge green worm with broad rings of black, bearing no resemblance to the beautiful, winged adult. It has several pairs of legs, biting jaws instead of a long, slender, sucking tube, and no wings. It eats greedily, grows rapidly and molts its skin several times, after which it enters upon the third, or pupal, period.

The Pupa. The third stage in the life history of the butterfly is a very quiet one, for the larva shuts itself up in a smooth, hard case known as a *chrysalis,* which is suspended from a twig or the underside of a leaf. During this period of inactivity the wings, legs and body of the mature insect are being formed, and other mysterious changes are taking place which science does not fully understand.

The Imago. When the end of the third period arrives the case splits open, and the *imago,* or fully-developed insect, is released from its prison.

Other Examples. Another interesting example of metamorphosis is that of the toad, which comes out of the egg a small, wriggling tadpole. This tiny creature lives under water and breathes by means of gills, but as it grows larger it develops lungs and pairs of fore- and hind legs, and gradually loses its tail. Finally it is ready to leave its home in the water and live for the most part on the land, a full-grown toad. The grasshopper is an insect which passes through but three stages of development, omitting the chrysalid period entirely. Its metamorphosis is therefore *incomplete.*

For special details, see FROG; TOAD; INSECT; BUTTERFLY; MOTH, and other articles describing animals subject to metamorphosis. Consult Lubbock's *The Metamorphosis of Insects.*

METAPHOR, *met' a for,* one of the commonest of the figures of speech, which indicates a resemblance between two objects by applying to one a name or an action which belongs to the other. In the simile the resemblance is pointed out by means of some such word as *like,* or *as;* in the metaphor it is merely implied; but the two figures resemble each other closely, and to change one into the other is easy. Literature abounds in metaphor, and the least poetic man uses it almost daily in his speech. Such expressions as "angry waves," "soft speech," "singing brook," are all metaphorical in their origin, though they have become so common that their figurative force is no longer felt. In such quotations as the following, however, the mind feels the force of the unaccustomed turns of thought, and is impressed by them:

> Lowliness is young Ambition's ladder,
> Whereto the climber-upward turns his face.
> —SHAKESPEARE: *Julius Caesar.*
>
> He were no lion, were not Romans hinds.
> —SHAKESPEARE: *Julius Caesar.*
>
> I am the vine, ye are the branches.
> —*Bible.*
>
> The Lord is my rock and my fortress.
> —*Bible.*

Mixed Metaphor. In the use of this very common and striking form of speech, there is a danger that an abrupt change of figure, or the use of two or more metaphors in too rapid succession, may give rise to the absurdity known as a mixed metaphor. The so-called "Irish bulls" are examples of this misuse of figurative language. Examples may often be found in newspapers, and recognized authorities in literature are sometimes betrayed into them. The following quotations from various sources are mixed metaphors:

The chariot of the revolution is rolling along and gnashing its teeth as it rolls.

The backbone of the cold wave is broken.

He received severe injuries at the hands of a bulldog.

METAPHYSICS, *met a fiz' iks,* a branch of philosophy concerning itself with such ultimate problems as the nature of substance, of cause, of time and space. It is the branch which, according to its spokesmen, should crown the whole structure of the physical sciences and become the final master-science.

The Greek philosophy gave to metaphysics a lofty reach. It was natural to the Greek mind to distrust simple appearance, and to look beyond the visible, tangible world of objects for another sort of reality, which such thinkers as Plato regarded as the deepest and most worthy reality. This idealistic view of the universe dominated philosophy for centuries, but it has undergone noticeable modification in the modern world, some critics going so far as to deny the utility of metaphysics.

The special sciences, physics, zoölogy, chemistry, etc., deal confidently with appearances—a world of things that can be touched and seen and which do not challenge the reality of these appearances. Metaphysics, on the contrary, in its quest of ultimate reality challenges and examines the assumption on which the special sciences rest.

The name metaphysics is derived from Greek words meaning *following the physics,* referring to the position this science had in the collected works of Aristotle.

Consult Calkins' *Persistent Problems in Philosophy;* Fullerton's *A System of Metaphysics.*

METCALFE, Charles Theophilus, Baron (1785-1846), a British statesman and colonial administrator, Governor-General of Canada from 1843 to 1845. Though personally a man of great popularity and many admirable qualities, Metcalfe received his training in a political school whose methods were those of the eighteenth century. It was unfortunate for his fame that he should have been sent to Canada at the very time when the struggle for responsible government was at its height. In India and Jamaica he had played the part of a benevolent autocrat, but when he tried the same rôle on Canada he was destined to failure, and his reputation has suffered because he opposed responsible government.

Metcalfe was born at Calcutta, India, but received his education in England. After his graduation from Eton in 1800 he returned to India to enter the service of the East India Company. Having been allowed to taste the delights of English society, young Metcalfe was reluctant to leave, but finally submitted when his father, a director of the company, insisted. He remained in India until 1838, more than half of his life being spent in the service of the East India Company. He became a member of the supreme council of India in 1827, and was temporary Governor-General in 1835. During this one year he initiated a number of reforms, the most important of which was to insure freedom of the press. "If India," he said, "could be preserved as a part of the British Empire only by keeping its inhabitants in a state of ignorance, our domination would be a curse to the country and ought to cease." Such ideas were not approved by the company's directors, and Metcalfe resigned in 1838.

In the next year the British government appointed him governor of Jamaica, where he showed great tact and executive ability, particularly in establishing more friendly relations between the negroes and the planters. In 1842 he returned to England, but in the next year was appointed Governor-General of Canada. There he found a government by party, which he had never before faced. Almost immediately he came into conflict with the assembly, and refused to admit the executive council's right to be consulted on appointments. The general elections of 1844 resulted in a defeat for the Reformers, and allowed Metcalfe to pick a council or cabinet which agreed with him. It was a misfortune for him as well as for Canada that he lacked the training and the temper to apply the new principle of government to Canada. In 1845 Metcalfe resigned and returned to England. W.F.Z.

METCHNIKOFF, *mech' ni kohf,* Elie (1845-1916), one of the world's greatest biologists, for many years a professor at Pasteur Institute, Paris. His theory that the congestion of blood

at a wound is the result of a struggle between the white blood corpuscles and the disease germs came to be commonly accepted before his death, but at the time he announced this law it was looked upon as revolutionary. This was one of Metchnikoff's great contributions to bacteriology; another was his insistence upon the knowledge of human physiology and pathology which might be gained from a study of animals. His life was bound up in his studies; the $20,000 which he received in 1908 as his share of the Nobel Prize he devoted to his researches; and his death came as the result of self-inoculation during an experiment.

Metchnikoff was born in the province of Kharkov, in Russia—a "son of the steppes," as he was proud of calling himself. He completed his four-years' university course in two years, studied at various German schools, and from 1870 to 1882 taught zoölogy in Odessa University. In 1892, after he had announced his discovery about the work of the white corpuscles, he received his appointment at Pasteur Institute, of which in 1895 he became subdirector.

Many of Metchnikoff's later researches were directed toward the combating of old age, and he regarded it as significant that he who came of a decidedly short-lived family lived to be over seventy. His theory, which has not as yet been fully tested, was that old age is brought on by accumulations of putrefactive bacteria in the intestines, and that to check these, preparations of sour milk should be included in the diet. One of his works, *The Prolongation of Life,* deals with this phase of his study. Other writings are *The Nature of Man, Lectures on the Comparative Pathology of Inflammation* and *Immunity in Infective Diseases.*

METEOROLOGY, *me te or ol' o ji,* a science of somewhat recent development, through which predictions are made as to weather conditions and approaching storms. The term is derived from two Greek words meaning *things in the air* and *discourse.* Meteorology is the study of atmospheric conditions, particularly in their relation to climate and weather, and it is a branch of natural science that directly concerns a large proportion of mankind. Practically every civilized nation maintains an official bureau for the study and forecasting of weather conditions, the most important of which are conducted by the governments of Great Britain, the United States, Canada, France, Germany, Austria-Hungary, Russia, Italy and Argentina.

Several times a day these bureaus receive reports by telegraph and cable from observation stations all over the world, and from these records they compile weather maps and make their forecasts. Bulletins and signals are displayed at specified places regularly, warning the public of changes in the weather, high winds, coming storms, floods and other conditions. One may read each day in the local newspaper the probable weather conditions for the day following, and these predictions are correct in a surprisingly large number of cases. The practical value of the science of meteorology to farmers, fruit growers, owners of merchant vessels and others whose business is directly influenced by weather conditions is beyond estimate, and warnings of approaching severe storms have in numerous cases been the means of saving human life.

In making observations for compiling weather maps and bulletins the conditions given the greatest weight are temperature, atmospheric pressure and humidity (amount of water vapor in the air). Cloudiness, evaporation, amount of rainfall, direction and velocity of wind and atmospheric electricity are other important elements. The principal instruments used are *thermometers,* for determining degrees of heat and cold; *barometers,* for measuring the pressure of the atmosphere; *hygrometers,* for ascertaining the amount of moisture in the air; *anemometers,* for recording the force and velocity of the wind; and *rain gauges,* for determining the amount of rainfall. Each of the instruments is described in these volumes. Upon temperature and barometric pressure depend the winds which bring fair or foul weather. Areas of high and low pressure are indicated on the weather maps, together with the direction of winds and the places where snow or rain is falling. Places of equal temperature are connected by *isothermal lines,* and those of equal pressure by lines called *isobars.* Symbols used for conveying information are explained by notes on the maps, which are so clear and simple that no one should have trouble in understanding them.

The weather bureau service of the United States, established in connection with the War Department in 1870, has been a part of the Department of Agriculture since 1891. That of the Dominion of Canada is conducted as a division of the Department of Marine and Fisheries.

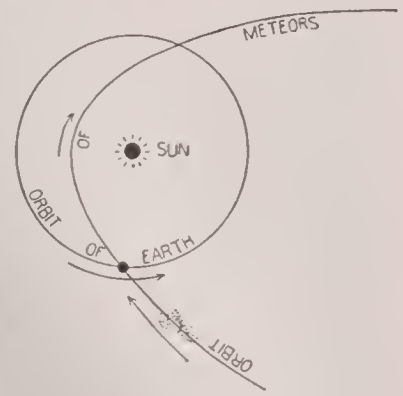
Consult Moore's *Descriptive Meteorology;* Milham's *Meteorology.*

Related Subjects. The reader is referred to the following articles in these volumes:

Air	Land and Sea Breezes
Blizzard	Lightning
Chinook	Monsoon
Climate	Norther
Cloud	Prevailing Westerlies
Cyclone	Rain
Dew	Simoom
Doldrums	Sirocco
Flood	Snow
Fog	Storms
Frost	Trade Winds
Hail	Typhoon
Humidity	Weather Bureau
Hurricane	Whirlwind
Isobars	Wind
Isothermal Lines	

METEORS, *me'te orz,* sometimes called SHOOTING STARS, are bodies which from above enter the atmosphere surrounding the earth and in their descent become heated by the friction of the air. In many cases the heat generated is so great that the meteors are consumed before reaching the earth. Before these meteors approach the earth's atmosphere they are invisible, traveling in an orbit round the sun. As soon as they touch the atmosphere their temperature is raised about 600,000 degrees. This causes an immense evolution of light, and meteors of the smallest proportions —appearing as merely pin points—become visible in the form of light, which may last barely a second, or sweep across the sky in a great arc, leaving a luminous trail lasting for several minutes.

Some meteors vanish in dust and ashes at a height of forty or fifty miles above the earth, others reach to within five or ten miles, while sometimes meteorites actually fall to the surface of the earth; they sometimes burst into several fragments with a noise that may be heard for some distance. At certain periods the earth encounters shoals of meteors, the sky apparently being filled with a shower of flying fires. The most brilliant meteoric shower recorded occurred on November 13, 1833, and it is now established that November is the month of meteoric displays. Every November, about the 13th, numbers of meteors become visible,



Orbit of the earth and of a meteor stream.

and it is authoritatively stated that meteoric showers are periodic, becoming extremely brilliant every thirty-third year. This is said to be due to the fact that a great ring of irregularly distributed particles revolves around the sun continually and the earth passes through the densest portion every third of a century.

Among the meteorites known to have fallen on the earth that are regarded as the most interesting and important is a huge meteorite weighing thirty-six and one-half tons brought from his first trip from Western Greenland by Peary, later the discoverer of the North Pole. In the British Museum, London, is a meteorite weighing three and one-half tons, and at Bacubirito in Mexico is a mass six feet wide and five feet thick which weighs fifty tons. At Knyahinya in Hungary a meteor weighing 547 pounds fell in 1886 and made a hole in the earth eleven feet deep, while small meteors fell on ice a few inches thick and rebounded. F.ST.A.

ME'TER, the rhythmical arrangement of words in poetry. A line, to be metrical, must be divided into a certain number of sections called feet which have the accent similarly placed. In the ancient languages the meter depended on the length of the *vowels*—short vowels must follow long, or *vice versa,* according to a regular rule. In English, as in most other modern languages, the vowel length has nothing to do with the matter, which depends entirely on the number of syllables and the placing of the accent. Of the meters in use in English the commonest are the *iambic,* in which each foot consists of two syllables, an unaccented followed by an accented, as:

As i'/dle as'/a paint'/ed ship';

the *trochaic,* in which an accented syllable is followed by an unaccented:

Scots', wha/hae' with/Wal'-lace/bled';

the *dactylic,* which consists of an accented syllable followed by two unaccented:

Hail' to the/Chief' who in/tri'-umph ad/van'ces;

the *anapestic,* in which each foot has two short and one long syllable:

And the night'/shall be filled'/with mus'/ic;

and the *amphibrachic,* in which one accented syllable occurs between two unaccented:

O hush' thee/my ba'-bie/thy sire' was/a knight'.

There are very often irregularities in these metrical forms, but every line of verse will be found to conform more or less closely to one

of them. Verse in which each line contains but two feet is known as *dimeter;* that of three feet as *trimeter;* four feet, *tetrameter;* five, *pentameter;* six, *hexameter,* and seven, *heptameter.*

METER, the unit of linear, or long, measure, in the metric system of weights and measures. It is equal to 39.37+ inches, and is therefore 3⅜ inches longer than the English and American yard. The present standard meter of the International Metric Commission is a bar of platino-iridium, forty inches long and eight-tenths of an inch square, grooved out on all four sides, thus providing the greatest rigidity. It is divided into decimeters, centimeters and millimeters. It is kept under a sliding, microscopic glass cover in the International Metric Bureau of Paris.

The length of the meter is one ten-millionth of the distance from the equator to the poles. It was adopted as the standard unit of length by France in 1799, and in 1837 its use was made obligatory. It has since been adopted

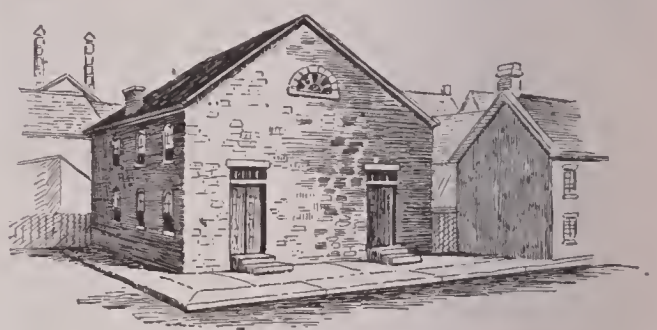
INTERNATIONAL METER

with the other units of the metric system in Germany, Austria-Hungary, Belgium, Spain, Italy, Greece, the Netherlands, Portugal, Norway, Sweden, Switzerland, Serbia, Rumania, Siam, Brazil, Chile, the Argentine Republic and Uruguay. Its use is legalized in the United States, Canada, Great Britain, Egypt, Japan, China, Turkey, Russia, Bolivia, Venezuela and Paraguay. See METRIC SYSTEM.

METHODISTS, *meth'ud ists.* When John Wesley, one of the world's great reformers, formed a little society for religious betterment, he did not think that he was founding a new sect. Indeed, he hated sectarianism, and to show this feeling called his followers simply the United Society; but lookers-on, seeing the ordered life and the moral strictness of the earnest leader and his followers, bestowed upon them the title of *Methodists.* This name, given half in derision, is now borne by all those who belong to the Churches which look upon Wesley as their founder. It would be untrue to say that it is borne by all who are, spiritually speaking, followers of Wesley, for there is not a Protestant Church which has not felt his influence and been largely modified by it.

Early Growth. The message which Wesley had for the people was so stimulating that it found everywhere a ready hearing, and the United Society grew beyond the bounds of a single association. Branch societies were formed in various communities, and these were subdivided into classes, over each of which a leader was placed. Wesley himself rode about preaching to them, but made no attempt to organize them into a single body or to separate them from the Church of England. In time, when the movement spread more widely, other clergymen, still of the Church of England, but accepting the new doctrines, took part of Wesley's work, and lay preachers also were appointed. Finally, as the Church of England refused to accept some of the results of Wesley's work, or to recognize his clergymen, the society became a separate denomination. Missionaries were sent out to America in 1784, and it was at a conference held in Baltimore late in that year that a formal Church organization was begun, and the title of *Methodist Episcopal* adopted.

Branches. The Methodist Church has been unable to avoid dissensions which have resulted in a division into various branches. In England the main body is that known as the Wesleyan Methodist Church, while in the United



LOVELY LANE MEETING HOUSE
Building in Baltimore in which the Methodist Episcopal Church was organized, in 1784.

States the Methodist Episcopal Church is the strongest. This body split on the slavery matter, however, and though this original question has long been settled, there still remains the Methodist Episcopal Church South, a numerous sect. There is also the African Methodist Church, organized especially for the colored people; the Free Methodist Church, which insists upon a return to the strict practices and simple living of former days; and the Methodist Protestant Church, which has as its basic principles the right of laymen to a part in Church councils.

In recent years a determined effort has been made to unite the Church North and South, and all indications are that in the near future, not later than 1924, the breach which has re-

tarded the work of Methodism in the United States will be closed. The General Conference of the Northern branch, in 1916, took definite steps in this direction. That such union can be accomplished successfully is proved in the case of Canada. In 1883 all the branches of Methodism there united, and since that date a movement has been on foot to join in this union the Presbyterian and Congregational churches, as well.

Doctrines and Government. The doctrines of the Church, based on the specific teachings of Wesley, have changed little, nor have they ever been the subject of much controversy. A belief in the divinity of Christ is fundamental, and other doctrines assert that all men are sinners, who may through belief in Christ receive forgiveness and adoption into the family of God; that God, while hating all sin, loves all men; that Christ died to make possible salvation from sin; that the Holy Spirit is given to convict men of sin; and that "sanctification," or living constantly in a spirit of love toward God and men, is possible to those who earnestly desire it.

In its form of government the Church is Episcopal, that is, it is organized as a hierarchy, with bishops at its head. The governing body, in most countries, is a General Conference which meets but once in four years, and is composed not only of bishops and other officials, but admits clerical and lay delegates, as well.

Influence. With a membership in 1915 of over 7,300,000 in the United States, 1,800,000 in the United Kingdom, 351,000 in Canada, and considerable numbers in Asia, South America and on the continent of Europe, the Methodist Church stands as one of the strongest of all Protestant denominations. It is also, and always has been, one of the most aggressive. It did much to bring about the abolition of slavery and much to forward the cause of general education, and to-day wherever Methodism has gone there are schools and colleges. Its missions are in all parts of the world, and its numerous publishing houses spread Christian literature broadcast.

Consult Tigert's *The Making of Methodism;* Green's *Mission of Methodism.*

METHUEN, *me thu' en,* MASS., a city of Essex County, thirty miles north and west of Boston, close to the New Hampshire state boundary line. It is on the Spicket River, a short northern tributary of the Merrimac, and on the Boston & Maine Railroad. The population, which in 1910 was 11,448, was reported by the state census of 1915 as 14,007, and by a Federal estimate in 1916 as 13,921.

Methuen has an area of twenty square miles. It is an attractive residential town for workers in adjoining towns. Among its art treasures are a large statue of Washington, sculptured by Ball, and one of the best-known memorial windows by John La Farge. The city has Nevin's Memorial Library, a fine high school building and the Nevin's Home for Aged and Incurables. There are manufactories of cotton and woolen goods, yarn and hosiery.

Methuen was first settled about 1641 and was a part of Haverhill until 1725, when it was incorporated as a separate town. W.L.S.G.

METHYLATED, *meth' i la ted,* **SPIRIT.** See WOOD SPIRIT.

METONYMY, *me ton' i mi,* derived from a Greek word meaning *change of name,* is a term applied to a figure of speech based upon significant relation of some kind. That is, a thing is called or described by some other than its own name, because the thing spoken of and the thing referred to have some important relationship. There are several kinds of metonymy, but the following are the most commonly used:

"The kettle boils." It is not the kettle that boils, but the water which the kettle contains. This is the use of the *container for the thing contained.*

"He deserves the palm." He deserves not the palm, but that for which it is a sign, the victory. This is termed the use of the *sign for the thing signified.*

"Have you read Shakespeare?" means "Have you read his works?" This is an example of *cause used for effect.*

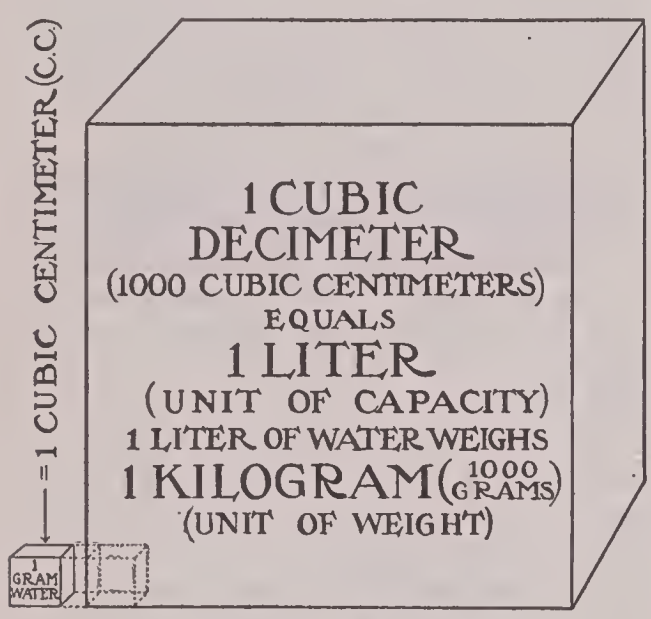
"Gray hairs should be respected." Gray hairs should not be respected, but old age, that of which they are the result. This is the use of *effect for cause.*

Synecdoche (which see), in which the part is put for the whole or the whole for the part, is a form of metonymy.

METRIC, *met' rik,* SYSTEM, a system of weights and measures which derives its name from its principal unit, which is the *meter.* The metric system was developed by a commission of French scientific men and was adopted as a legal system of weights and measures in France in 1799. During the nineteenth century one after another of the countries of the world adopted it on account of its simplicity and of the many advantages it possesses over the old local weights and measures. To-day nearly every country in Europe and

most of the republics of South America use the metric system, and it has also been legally recognized in Japan and China. England and its possessions and the United States are the only civilized countries that have not adopted it for common use, although these legally recognize it. For scientific work and measurements the metric system is used all over the world.

In 1866 Congress passed the law making the use of the metric system legal in the United States for those who wish to use it, and since that time it has been adopted for many purposes. It is used in all the base measurements and the computations of the Coast and Geodetic Survey, in weights at the mint for coining money, in weighing all foreign mail matter, and in all the government departments dealing with the operations of the tariff laws, as well



UNITS FOR COMPARISON

as in the United States Bureau of Standards at Washington. Since 1894 the legal units of electrical measures in the United States are based on the metric system. The metric system is the legal system of weights and measures in Cuba, Porto Rico and the Philippines.

A knowledge of the metric system is therefore very useful and in some cases absolutely necessary. Anyone who intends to engage in business, and especially in foreign trade, or who wishes to enter the civil service, or intends to become an engineer, or who is planning to study any branch of pure or applied science, must have a good knowledge of the metric system—a system quite easily learned on account of its simplicity.

How It Is Organized. The metric system presents many advantages. The principal unit of the system is the *meter,* which is the unit of length, in the same sense that the *yard* is our common unit of length. All the other units of surface, volume, capacity and weight are directly derived from it. Furthermore, the interrelation between them is a very simple one, as a definite volume of water is taken as the unit of capacity and mass. Thus one *liter* contains one *cubic decimeter* of water and weighs one *kilogram.* Then the whole system has a uniform scale of relation between its units, which is a decimal one, that is, the scale selected for the multiples and subdivisions of the various units is ten. This is shown in the following table:

ten millimeters	=one centimeter
ten centimeters	=one decimeter
ten decimeters	=one METER
ten METERS	=one dekameter
ten dekameters	=one hektometer
ten hektometers	=one kilometer
ten kilometers	=one myriameter

The same is true for the other units, the *liter* and the *gram.* Thus *ten liters* are equal to one *dekaliter,* or ten *decigrams* are equal to one *gram.*

Another advantage of the metric system is its uniform system of names, which are formed by adding to the chief units the same prefixes, as given in the table below. Each unit is divided into tenths, hundredths, thousandths and so on, for subdivisions, and multiplied by ten, hundred, thousand, and so on, for units of higher denominations.

The names of the higher denominations are formed by the use of Greek prefixes and the names of the subdivisions by the use of Latin prefixes:

Greek	myria	means 10,000
	kilo	means 1,000
	hekto	means 100
	deka	means 10

The units are the *meter, liter, gram.*

Latin	deci	means one tenth (.1)
	centi	means one hundredth (.01)
	milli	means one thousandth (.001)

Metric numbers are written decimally, with the decimal point placed immediately after the unit. For example, 156.735 m. reads 156 meters and 735 millimeters; or 156.735 g. reads 156 grams and 735 milligrams. Calculations with the metric system are easy and are made according to decimal rules. Any denominations may be reduced to the next higher by moving the decimal point to the left, or to the next lower by moving the decimal point to the right.

The Unit of Length. The unit of length is the *meter,* which is described at length in these

volumes under its own title. The measure used for long distances is the kilometer, which is about three-fifths of a mile. We say, for instance, that Versailles is nineteen and one-half kilometers from Paris.

The Unit of Surface. The unit of surface is the square meter, that is, the area of a square each of whose sides is one meter. The multiples and subdivisions go by the square of ten, which is a hundred; thus, one square dekameter is equal to one hundred square meters, and one square decimeter is one-hundredth part of a square meter. The *are,* which has 100 square meters, and its multiple, the hektare, which has 100 ares, or 10,000 square meters, are used for ordinary land measurements. For measuring large areas, such as countries or provinces, the square kilometer is used.

The Unit of Volume. The unit of volume is the cubic meter, that is, a cube of which each edge is one meter. The multiples and subdivisions go by the cube of ten, which is a thousand; thus, one cubic dekameter is equal to one thousand cubic meters, and one cubic decimeter is equal to one-thousandth part of a cubic meter. When used for measuring wood, the cubic meter is called a *stere.*

The Unit of Capacity. The unit of capacity is the *liter,* which contains the quantity of one cubic decimeter of distilled water at its greatest density, that is at the temperature of 39.2° F. and at sea level. The liter is used for measuring liquids, such as milk, wine, and so on, and also for small fruit. For grain, vegetables and liquids in casks the usual measure is the *hektoliter.*

The Unit of Weight. The unit of weight is the *gram,* which is the weight of one cubic centimeter of distilled water at its greatest density, that is, at the temperature of 39.2° F. at sea level. One thousand cubic centimeters, which make one cubic decimeter, contain the capacity of one liter and weigh one thousand grams, or a kilogram. For weighing usual articles the kilogram is used; for heavy articles the ton, which has one thousand kilograms. Another example will further show the simple interrelation that exists between all the units of the metric system. Thus, one thousand kilograms, or a ton, is equivalent to one thousand cubic decimeters, or a cubic meter, and to one thousand liters, or a kiloliter. The United States five-cent piece weighs five grams, and has a diameter of two centimeters. One silver half-dollar weighs twelve and one-half grams. Forty dollars of United States silver subsidiary money weigh one kilogram. For fine scientific weights the unit adopted is the *microgram,* which is a thousandth part of a milligram, or a millionth part of a gram. Since 1913 the *carat,* the usual weight for measuring diamonds and other precious stones, has also been standardized. The new international carat weighs 200 milligrams, and is therefore one-fifth of a gram. The usual old carat had a weight of 205.3 milligrams.

Tables. The following are the tables of the metric system:

Measures of Length

A myriameter (Mm)	= 10,000 meters
A kilometer (Km)	= 1,000 meters
A hektometer (Hm)	= 100 meters
A dekameter (Dm)	= 10 meters

A Meter

A decimeter (dm)	= 0.1 of a meter
A centimeter (cm)	= 0.01 of a meter
A millimeter (mm)	= 0.001 of a meter

Surface Measures

A square kilometer (km^2)	= 1,000,000 square meters
A square hektometer or hektare (ha)	= 10,000 square meters
A square dekameter or are (a)	= 100 square meters

A Square Meter

A square decimeter (dm^2)	= 0.01 of a square mile
A square centimeter (cm^2)	= 0.0001 of a square mile
A square millimeter (mm^2)	= 0.000001 of a square mile

Cubic Measures

A cubic hektometer	= 1,000,000 cubic meters
A cubic dekameter	= 1,000 cubic meters

Cubic Meter

A cubic decimeter (dm^3)	= 0.001 of a cubic meter
A cubic centimeter (cm^3)	= 0.000,001 of a cubic meter
A cubic millimeter (mm^3)	= 0.000,000,001 of a cubic meter

Measures of Capacity

A hektoliter (hl)	= 100 liters
A dekaliter (dal)	= 10 liters

Liter

A deciliter (dl)	= 0.1 liter
A centiliter (cl)	= 0.01 liter
A milliliter (ml)	= 0.001 liter

Measures of Weight

A ton (t)	= 1,000 kilograms
A kilogram (kg)	= 1,000 grams
A hektogram (hg)	= 100 grams
A dekagram (dg)	= 10 grams

Gram

A decigram (dg)	= 0.1 gram
A centigram (cg)	= 0.01 gram
A milligram (mg)	= 0.001 gram

The abbreviations given in the above tables are those officially adopted by the International Congress of Weights and Measures.

Equivalent Measures. The following tables give the equivalents of the principal units of the metric system and those of the English, Canadian and United States system:

Metric System		English Measurements	
	Length		
Meter	= 1.093 yard	Yard	= 0.9144 meter
	= 3.281 feet	Foot	= 0.3048 meter
	= 39.370 inches	Inch	= 0.0254 meter
Kilometer	= 0.621 mile	Mile	= 1.609 kilometer
	Surface		
Square Meter	= 1.196 square yards	Square yard	= 0.836 square meter
	= 10.764 square feet	Square foot	= 0.092 square meter
Square centimeter	= 0.155 square inch	Square inch	= 6.45 square centimeters
Square kilometer	= 0.386 square mile	Square mile	= 2.590 square kilometers
Hektare	= 2.471 acres	Acre	= 0.405 hektare
	Volume		
Cubic Meter	= 1.308 cubic yard	Cubic yard	= 0.764 cubic meter
	= 35.314 cubic feet	Cubic foot	= 0.028 cubic meter
Cubic centimeter	= 0.6103 cubic inch	Cubic inch	= 16.387 cubic centimeters
Stere	= 0.275 cord	Cord	= 3.624 steres
	Capacity		
Liter	= 1.056 U. S. liquid quart or [0.878 English liquid quart]	U. S. liquid quart	= 0.946 liter
	= 0.908 dry quart	Dry quart	= 1.111 liter
	= 0.264 U. S. gallon or [0.220 English gallon]	U. S. gallon [English gallon	= 3.785 liters = 4.543 liters]
Hektoliter	= 2.837 U. S. bushels or [2.75 English bushels]	U. S. bushels [English bushels	= 0.352 hektoliters = 0.363 hektoliters]
	Weight		
Gram	= 15.432 grains	Grain	= 0.0648 gram
	= 0.032 troy ounce	Troy ounce	= 31.103 grams
	= 0.352 avoirdupois ounce	Avoirdupois ounce	= 28.35 grams
Kilogram	= 2.2046 pounds avoirdupois	Pound	= 0.4536 kilogram
Metric ton	= 2204.62 pounds avoirdupois	Short ton	= 0.907 metric ton
Carat	= 3.08 grains avoirdupois		

These tables contain the chief units of both systems. All other measurements can be easily calculated with the aid of these tables.

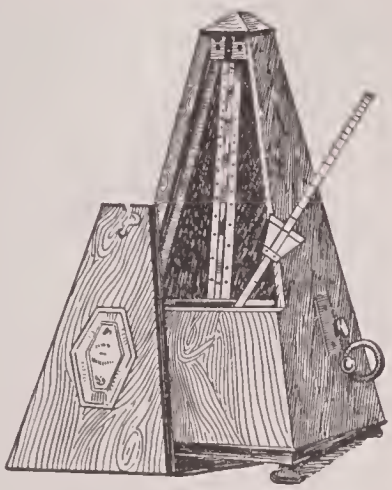
The metric system having become an international system, it has been decided by delegates representing most of the civilized countries to establish an International Bureau of Weights and Measures. This bureau is now located at the entrance to the park of Saint Cloud, near Paris, on neutral territory ceded by France for that purpose. Here are kept the international standards, or prototypes of the metric system, namely, the meter and the kilogram, which are made of a special alloy of platinum and iridium. Two exact duplicates of these standard measures have been sent to every government that took part in the establishment of the international bureau. The standard duplicates sent to the United States were received by President Harrison at the White House on January 2, 1890, and are now deposited at the United States Bureau of Standards in Washington. In 1893 the United States adopted the meter and the kilogram as the fundamental standards from which the yard and pound are derived. In the United States the yard is now legally defined as $\frac{3600}{3937}$ of a meter, and the pound, as $\frac{1}{2.204622}$ of a kilogram.

Several attempts have been made to introduce the general use of the metric system in the United States. As far back as 1790 Thomas Jefferson, then Secretary of State, presented to Congress a report recommending the introduction of a decimal system of weights and measures. Again in 1821 John Quincy Adams, in a classical report to Congress on weights and measures, strongly recommended the adoption of the metric system. Several later but unsuccessful attempts have been made. O.B.

Related Subjects. The reader is referred to the following articles in these volumes:

Gram
Kilogram
Kilometer
Liter
Meter
Weights and Measures

MET'RONOME, from two Greek words meaning *measure* and *law,* is the name of an instrument designed to enable performers to play in exact time. It consists of a weighted pendulum which swings in front of a graduated scale. This pendulum moves on a pivot and is kept in motion by clockwork. Its vibration indicates the correct time or speed at which a musical composition should be played. By shifting a sliding weight attached to the pendulum, either up or down, the vibrations are made slower or faster, the scale indicating the number of beats each minute. The metronome was patented by Johann Maalzel in 1816, but the credit for the invention belongs to Winkel of Amsterdam. For helping pupils play exercises in accurate time the instrument is useful, but anyone who should become accustomed to playing all compositions according to its beat would develop a mechanical style of performance.



METRONOME

METROPOLITAN MUSEUM, *met ro pol' i tan mu ze' um,* **OF ART,** the largest and most important art museum in the United States, located in Central Park, New York City. It had its beginning in November, 1869, when a committee was appointed to organize the project and raise an endowment of $250,000 for the purpose. The New York state legislature appropriated $500,000 for the building, a portion of which was completed in 1879. In 1902 the central part of the structure, facing Fifth Avenue, was completed at a cost of $1,200,000 to the city. A board of trustees, selected from among the membership subscribing to its maintenance, governs the museum.

The art treasures are classified in different departments and form a magnificent collection, one of the richest in the world. The department of paintings contains pictures from Old English, Dutch, Flemish and French masters, its nucleus being acquired in 1871. The Catherine Lorillard and Wolfe bequest also contained European paintings. The Benjamin Altman collection, willed to the museum in 1913, is valued at $15,000,000, while the Cesnola collection of antiquities is the richest collection of classical art in the world. The museum has received many legacies both in money and art collections and contains one of the best libraries of art in the United States.

The following examples of painting and sculpture are representative of the art treasures owned by the museum:

Madonna Colonna ..... Raphael
The Mills ..... Rembrandt
Portrait of Lady Carew .... Sir Joshua Reynolds
The Holy Family ..... Paul Reubens
The Horse Fair ..... Rosa Bonheur
Girl with a Cat ..... Thomas Gainsborough
Miss Rich Building a House of Cards .....
..... William Hogarth
Retreat from Moscow ..... Gustave Doré
Autumn Oaks ..... George Inness
Ville d'Avray ..... Jean B. Corot
Ariadne in Naxos ..... George F. Watts
Portrait of George Washington .... Gilbert Stuart
Statue of a Prince of the Julio-Claudian Family
..... (First century A. D.)
Etruscan Bronze Chariot .... (Sixth century B. C.)

METTERNICH, *met' er niK,* Clemens Wenzel Nepomuk Lothar, Prince (1773-1859), an Austrian diplomat and statesman and chief minister of the empire for thirty years. He was born in Coblenz and educated at the University of Strassburg. At the coronation of Leopold II he represented the princes of Westphalia, when only seventeen. In 1794 he settled in Vienna and in 1795 married the granddaughter of Kaunitz, the Austrian chancellor. This alliance brought him great estates. His natural charm of manner and reputation for gallantry made him a prominent figure at the court in Vienna, and his diplomatic career began in 1803, when he became ambassador to Germany. When war was declared between Austria and France he was detained for some time by Napoleon, but when set free he eagerly entered the anti-Napoleon league. He endeavored to make Austria the chief country to profit by the reapportionment of European territory, and in the following years exercised the highest authority in Austria, almost without limit. In the Holy Alliance (which see) his diplomacy enabled him to take a leading position, and he attempted to repress all national independence. After the revolution of 1848 he was driven from power and went to England. He returned to Vienna in 1851, but never undertook to recover his prestige.

METZ, *mets,* one of the strongest military posts of Europe, in Alsace-Lorraine, France, on the banks and islands of the Moselle River, about eighty miles northwest of Strassburg. It was originally a Roman camp, called Divodu-

rum, a name changed to Metac by the Vandals. During the sixth century it was plundered by the Huns, and after that it changed ownership very rapidly. For a time it belonged to the Franks, then became a free city of the German Empire, was taken by the French in 1552 and formally given to them in 1648. In 1870 it fell to the Germans and was kept by them in the treaty of 1871, at the conclusion of the Franco-German War. During the War of the Nations it was just back of the battle line and was frequently menaced (see WAR OF THE NATIONS). The treaty of Versailles, in 1919, gave the provinces back to France.

Metz lost some of its importance commercially after it became German, because of the withdrawal of French capital and trade, but French interests are already returning to the city, and it is again prosperous. Arms, hats, artificial flowers, preserves, muslin and hosiery are important products. The pride of the town is the Cathedral of Saint Vincent, an example of thirteenth-century architecture. The masonry is of such a light, fanciful style that it seems but a framework for the fine windows. Population, 1910, 68,600.

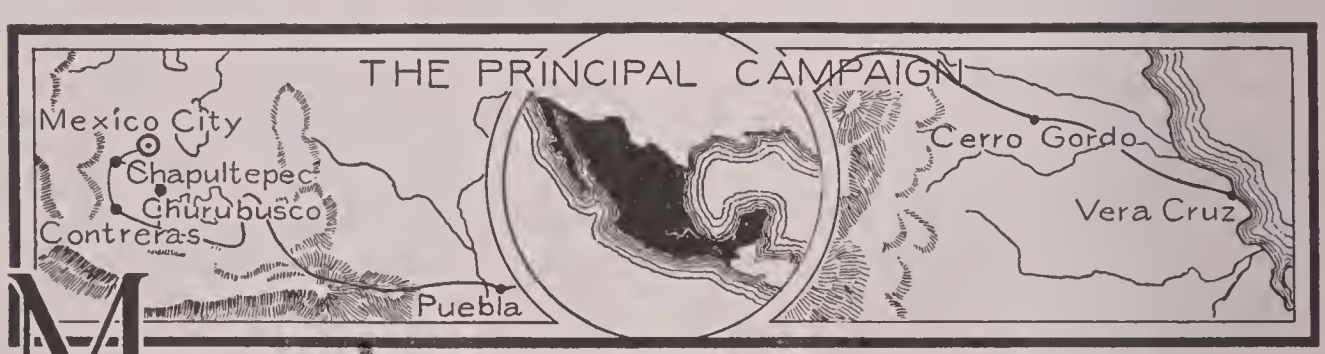
MEUSE, *muze,* an important river of Western Europe. It was conspicuous in the War of the Nations, as the line of its valley was followed in part by the German army in its first invasion of Belgium and France; also in the spring of 1916 and again in 1917 furious fighting occurred on its banks when the German forces made a series of desperate attacks on the forts commanding the city of Verdun, which lies at the head of navigation.

The Meuse rises in northeastern France, in the department of Haute-Marne, and first flows north through the Ardennes highlands, then northeast through Belgium into Holland. After turning westward the river joins the Waal, emptying into the North Sea through a great delta. Its length is 498 miles and for 355 miles it is navigable. The chief tributaries are the

COURSE OF THE MEUSE

(*a*) Belgium; (*b*) Luxemburg; (*c*) Lorraine; (*d*) Alsace; (*e*) Netherlands (Holland).

Sambre, Semoy, Roer and Ourthe. It is connected with an extensive system of canals in Holland and Belgium, and in its upper course it is joined by a canal to the River Saone. The principal cities in France on the Meuse are Sedan, Givet, Charleville and Verdun. Liége, where the armies of Kaiser Wilhelm met their first resistance in the war, and Namur in Belgium, and Rotterdam, Dordrecht and Roermond in Holland, are on this historic stream.



MEXICAN WAR. The immediate cause of the war was the annexation of Texas in 1845. In 1836 Texas revolted from Mexico and was successful in establishing an independent republic, which was recognized by the United States in 1837. Notwithstanding the fact that Texas had been recognized by several of the leading European nations, as well as by the United States, Mexico never acknowledged its independence. There was constant friction between Texas and Mexico, and the latter had warned the United States that the annexation of Texas to the American Union would be considered as a declaration of war. The Texas question had been before the country for a number of years, and it was a prominent issue in the Presidential campaign of 1844, the Democrats favoring and the Whigs opposing annexa-

tion. The Democratic candidate, James K. Polk, was elected, and the addition of Texas to the Union was the first important measure of his administration.

Had the United States adopted conciliatory measures it seems probable that war might have been prevented, but a dispute arose over the western boundary of Texas and this still further aggravated the Mexicans. Texas claimed the Rio Grande as its western boundary, and Mexico claimed that the Nueces River, a stream about 100 miles further east, was the boundary. The territory in dispute had an area of about 2,000 square miles, and President Polk did not intend to await diplomatic negotiation to secure it; he therefore ordered General Taylor, who was stationed on the Nueces with a force of about 3,000 men, to proceed to the Rio Grande. Taylor's advance was answered by a counter advance by the Mexicans into the same territory, and on April 23, 1846, a small detachment of Americans was defeated by a body of Mexicans. President Polk sent a message to Congress declaring that a state of war existed "through the act of Mexico herself." On May 13 Congress declared war and immediately voted money and supplies for its prosecution.

The Campaigns. The war was conducted under four campaigns—the campaign along the Rio Grande under the command of General

TAYLOR'S CAMPAIGN

Zachary Taylor, against Mexico City under General Winfield Scott, in California under Admiral Stockton and Captain John C. Fremont, and in New Mexico under General Stephen W. Kearney. The important battles of the Mexican War are described under their respective titles; only a summary of the events of each campaign is included in this article.

Taylor's Campaign. On May 8 Taylor defeated a superior force of Mexicans at Palo Alto and the following day at Resaca de la Palma. On May 18 he captured Matamoros, where he remained until September, when he advanced upon Monterey, which he entered on September 24, after a short siege. About 10,000 of his troops were then ordered to join the forces of General Scott, who had appeared off Vera Cruz and was preparing to advance upon the City of Mexico. A copy of this order fell into the hands of Santa Anna, the Mexican commander-in-chief, and he at once advanced with a large army against Taylor, who had stationed his army at Buena Vista. The engagement resulted in a disastrous defeat for the Mexicans and a brilliant victory for the Americans. Soon after the Battle of Buena Vista Taylor resigned his command and returned home.

Scott's Campaign. General Scott, who as ranking general was commander of all the American forces in Mexico, appeared before Vera Cruz on March 7, 1847, with an army of 12,000 men. After a siege of three weeks the city was taken and the way to the city of Mexico was open. Two months after the fall of Vera Cruz Scott began his march towards the enemy's capital. His path was beset with difficulties, and considering the size of his army his undertaking was hazardous. He stormed the pass at Cerro Gordo and pressed on towards Puebla, driving the Mexicans before him. The Americans remained at Puebla until August, when the march was resumed. On August 19 and 20 three battles were fought, at Contreras, San Antonio and Churubusco, respectively, about ten miles from the city of Mexico. In all these engagements the Mexicans far outnumbered the Americans, but the superior skill and bravery of the American officers and troops enabled them to win decisive victories. An armistice of three weeks followed the Battle of Churubusco, then the Americans advanced to the city's gates. They won a brilliant victory at Molino del Rey, and on September 13 stormed the heights of Chapultepec. The next day Scott's victorious army entered the capital of the Montezumas, and the war was practically at an end. The map of Scott's route to the capital appears in the illustration heading this article.

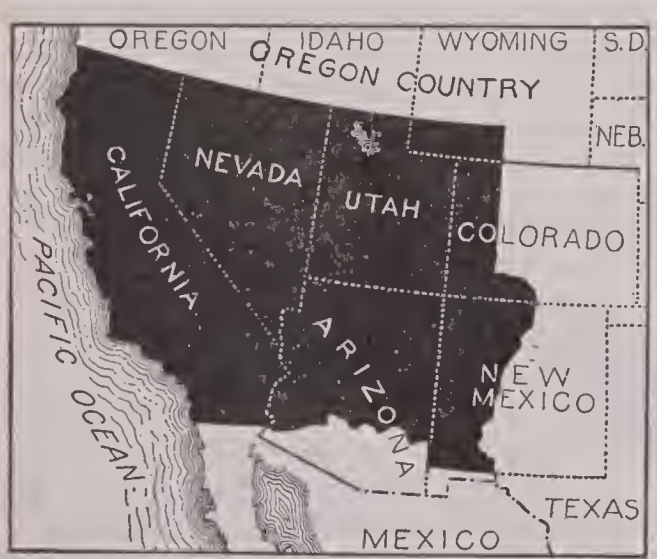
Other Campaigns. While Taylor was advancing up the Rio Grande, the American forces

under Kearney had occupied New Mexico and a detachment under Colonel Doniphan had taken possession of important territory around Chihuahua. Meantime, Stockton and Fremont had established American control over California, so all the territory between the western boundary of the Louisiana Purchase and the Rio Grande was under the control of the United States.

The Treaty of Peace. The superior generalship and training of the American forces had enabled them to win every battle, although they were confronted by superior numbers, and the Mexicans fought bravely. The disastrous effects upon Mexico were such that for a time there was no recognized authority with which a treaty of peace could be negotiated, and it was not until February 2, 1848, that the Treaty of Guadelupe Hidalgo was signed, and not until May that it was ratified.

During the course of the war about 43,500 American soldiers served in Mexico or on the northern border; of these, slightly more than half were volunteers, the remainder being regulars.

Results of the War. The results of the Mexican War were more far-reaching than even its strongest supporters anticipated. The immediate cause of the war has already been stated, but in order that the results may be understood,



WHAT MEXICO GAVE TO THE UNITED STATES

a reference to the indirect causes is necessary. By the terms of the Missouri Compromise (which see) slavery was prohibited north of the boundary 36° 30′. Texas was the last state within which slavery was possible that could be admitted to the Union, unless new territory south of this limit could be secured, while north of this boundary there was territory out of which a number of new states could be organized. This meant that the free states would soon have a majority in the United States Senate, and the proslavery faction in Congress hoped that new slave territory might be secured through a war with Mexico. Moreover, President Polk's ambition was to gain for the United States all the territory between the western boundary of the Louisiana Purchase and the Mexican border. In this he was successful, since its defeat compelled Mexico to sell this territory to the United States for a nominal sum, $18,250,000. The introduction into Congress of the Wilmot Proviso, however, prevented this newly-acquired possession from being declared slave territory.

The direct results of the war were, first, the addition of over 525,000 square miles of territory to the United States, from which have been organized the states of California, Nevada, Utah, a part of Colorado, most of Arizona, Western New Mexico, and a small part of Wyoming. The second result was the reorganization of the political parties along the lines of antislavery and proslavery. Strange as it may seem, the party that won the war was defeated at the next Presidential election, and General Taylor, the hero of Buena Vista, became President.

The indirect results were, first, the prestige which the acquisition of an extended coast line on the Pacific gave the United States; second, the development made possible by the discovery of gold in California and the consequent addition to the nation's resources; third, the launching of the doctrine of squatter sovereignty (which see) that became one of the steps leading to the War of Secession, and fourth, the training which this war afforded officers who were to take prominent parts in that great struggle—among them being George B. McClellan, George G. Meade, U. S. Grant, William T. Sherman, Robert E. Lee, Jefferson Davis and "Stonewall" Jackson. W.F.Z.

Consult McElroy's *The Winning of the Far West;* Wilcox's *History of the Mexican War.*

Related Subjects. The reader is referred to the following articles in these volumes:

Buena Vista, Battle of
Chapultepec, Battle of
Churubusco, Battle of
Fremont, John C.
Guadalupe Hidalgo, Treaty of
Mexico, subtitle *Government and History*
Monterey, Battle of
Palo Alto, Battle of
Polk, James K.
Resaca de la Palma, Battle of
Scott, Winfield
Taylor, Zachary
Texas, subhead *History*
Wilmot Proviso

MEXICO, the southernmost country of North America, excepting the small states of Central America, is a great republic which, because of its nearness to the United States, has always been of great interest to the latter country. "The Land of Mañana," which means "The Land of To-morrow," it is sometimes humorously called; for its people, indolent because of the tropical climate, and listless because of the misery and poverty which have been their lot for many generations, show an unconquerable tendency to put off all progress and effort "hasta mañana"—"until to-morrow." Narrowing rapidly from north to south and curving toward the east, Mexico is in shape somewhat like the old "horn of plenty." Two great peninsulas jut out from the mainland—in the south Yucatan, which turns northward and encloses a broad curve of the Gulf of Mexico; in the northwest Lower California, separated from the western coast of the mainland by the Gulf of California.

Its Position and Measurements. Mexico stretches from latitude 15° to 33° north, thus lying through half its length in the torrid zone, and through the other half in the north temperate zone. Since its form tapers sharply, the area of the northern or temperate portion is the greater, yet Mexico is commonly regarded as a tropical country. On the north California, Arizona, New Mexico and Texas are its neighbors, the last-named state being separated from it by the famous Rio Grande, which forms over 1,100 of the 1,833 miles of the northern boundary line of the country. To the east are the Gulf of Mexico and the Caribbean Sea, to the south British Honduras, Guatemala and the Pacific Ocean, while the whole western boundary is formed by the Pacific Ocean and its long, narrow arm—the Gulf of California.

LOCATION MAP

The border line with the United States marks its greatest east and west breadth, and the Isthmus of Tehuantepec, 134 miles across, is its narrowest point. Its greatest length, from northwest to southeast, is about 1,900 miles, and its total area is 767,055 square miles. It is thus about three times as large as Texas, and a little larger than the Canadian provinces of Quebec, Nova Scotia and New Brunswick, or than the whole north-central division of the United States. Among the nations of the Western hemisphere four—Canada, the United States, Brazil and Argentina—surpass it in size, but only the United States and Brazil have a greater population (see population statistics, under subtitle below).

The People of Mexico

What Is a "Mexican?" Mexico had in 1910 a population of about 15,112,600 people; an accurate census has never been taken because of the superstitious fears of the people. When a census taker appears they conceal from him as many facts as possible, thinking that he may do them harm in some way—at the very least make them pay heavier taxes. The people are for the most part very ignorant; this is not strange when it is considered that out of the whole population only nineteen per cent may be classed as pure whites, while the remaining eighty-one per cent are Indians or of mixed Indian and white blood. The typical Mexican, then, is quite sure to have Indian blood in his veins and to have inherited with it most of the superstitions, the customs and the vices which his Indian ancestors possessed four centuries ago, before the Spanish conquest. See subtitle, *Government and History.*

COMPARATIVE AREAS

At left, Mexico is shown as large enough to cover that section of the United States which appears in black. At right, the British Isles are shown set into Mexico, the two being drawn to the same scale.

It is somewhat difficult to give the characteristics which distinguish Mexicans, so poorly have the different Indian tribes been assimilated; but for the most part it may be said that, whether Indian or half-breed, they are pleasure-loving, fond of ease, unreliable and totally incapable of understanding the principles of wise and sane living. The wages they earn are all too small, but whatever they can save above the bare necessities of life they almost invariably spend foolishly. Particularly strong is their love for intoxicating liquors, and every festive day serves as an excuse for excessive drinking.

Living Conditions. The foreigners, of whom there were about 100,000 in the country before the revolutions which began in 1911, have introduced so far as possible their own modes of life, and the results are notable in the large cities. Here, to some extent, European and American methods have been introduced, and it is frequently possible for the traveler to find a fairly good hotel with electric lights and only a moderate amount of dirt, instead of the indescribable lodging houses of the past. The "native whites," if so they may be called, are Spaniards; and many of them live in a style which has much of display if very little of solid comfort.

But the mass of the people, the Indians and half-breeds, live in the most squalid poverty. Their little one-story houses of adobe, or sun-dried brick, lack all means of comfort and of sanitation, and the death rate, especially from filth diseases, is very high. Having resisted all progress for centuries, they live to-day on the same food which satisfied their ancestors hundreds of years ago, and for the most part they cook it in the same way. There are *tortillas,* or thin cakes of corn, and *frijoles,* or black beans, cooked with the pungent red peppers of which they are so fond; these are the staple articles of food the year round. Even such variation of diet as the poorest family can hope for in the United States or Canada is unknown to these Mexicans. Indeed, it is scarcely fair to compare the present Indians of Mexico with those that Cortez found there, for the latter were in a more advanced state of civilization.

TYPICAL ADOBE HOUSE
(See the article ADOBE.)

The official language of Mexico is Spanish, but the Indian tribes have clung steadfastly to their own languages, which are numerous.

Education. The government of the republic has not neglected the question of education, but the task before it is an appalling one. Every state has free primary schools, and each has compulsory education laws, but in the disordered condition of affairs which has prevailed almost without cessation since the founding of the republic these have not been enforced, and illiteracy is still widespread. Among most of the Indian tribes no progress has been made, for it has never been possible to convince them that there could be the slightest value in education; two tribes, however, the Mixtecas and Zapotecas, have been more progressive, and some of the foremost men of the nation have come from them.

In addition to primary schools, almost 1,000 in number, which are supported in part by the Federal government and in part by the states and municipalities, there are a number of secondary schools, normal schools and professional schools. The United States is proud of the institutions of higher learning which were founded in its very early history, but Mexico had a university in 1553—before the vast region to the north of it had even been explored. For over three centuries, until 1862, this institution carried on work, but in that year it closed its doors. In 1910, however, it was reorganized, and bids fair to exert a strong influence on educational affairs in Mexico.

Religion. Mexico has no state Church, but no country with an established religion has people more uniformly of one faith. The Roman Catholic Church, to which most of the people belong, has always had an important place in the history of the country; indeed, missionaries fired with zeal for the conversion of the Indians were among the very first arrivals. Most of the Indians are, nominally at least, converts to Christianity, but they cling to many heathen rites and superstitions, often sacrificing in secret to the gods their ancestors worshiped before the coming of the Spaniards in the sixteenth century.

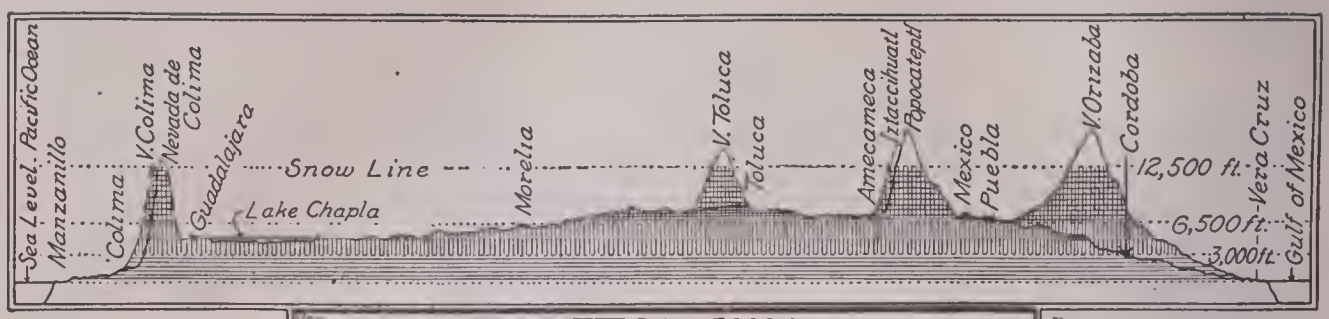
It was not until 1859 that Church and State were separated in Mexico and the vast properties which had been accumulated by the Church nationalized. At about that time freedom of faith was allowed. The various Protestant denominations took advantage of this liberty to send missionaries into Mexico, and their work has continued steadily ever since. Growth has been slow, however, and at present all the Protestant churches together have a membership below 25,000.

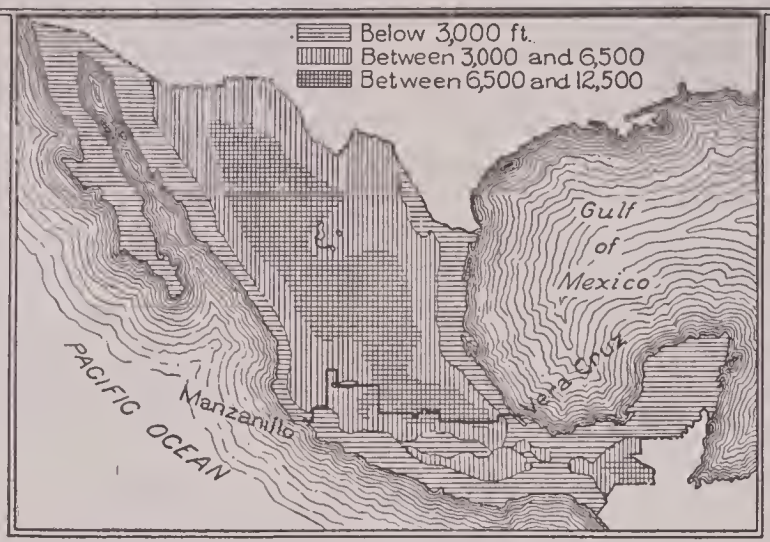
The Geography of Mexico

Its Coast. Mexico has a total coast line of about 6,300 miles, of which 4,574 miles are on the Pacific Ocean and Gulf of California. All along the eastern border the shore is low and sandy, presenting few points of interest except where the mountains approach the coast closely enough to be seen from the shore. The ports on this Atlantic side are by nature almost worthless, but much money has been spent on making certain of them, as Tampico and Vera Cruz, secure and commodious. On the Pacific coast, on the other hand, there is a series of excellent ports, Acapulco, especially, comparing well with almost any other port in the world. But these present no such busy scenes as does San Francisco Bay, for instance, farther north on the same coast; indeed, some of them are scarcely valuable, because they are shut off by towering mountains from the industrial centers of the country. The western shore line is for much of its length as flat and monotonous as the eastern, but at intervals offshoots from the country's great mountains run down to the sea and there break off abruptly and picturesquely.

Its Surface. There are three well-marked surface regions in Mexico. These are a great central plateau; two border ranges, one on the east and one on the west; and a fringe of coastal lowland, in places very narrow. The great force in making Mexico geographically what it is to-day has been volcanic action, and the high plateau was built up very largely from the outpourings of volcanoes. In the south the table-land is 8,000 feet above sea level, but it slopes gently to the north, and at the United States boundary line is only 3,600 feet in altitude. Rising above its surface here and there are mountain peaks, which would appear much taller were it not for the general high level of the plateau.

Dividing this plateau region from the "hot lands" of the coast, which vary in width from ten to one hundred miles, are the Sierra Madre Oriental, on the east, and the Sierra Madre Occidental, on the west. The latter range has throughout its extent an average height of more than 10,000 feet. As the country narrows toward the south these border ranges approach each other more and more closely, and finally join in a wild jumble of peaks and valleys, somewhat north and west of the narrowest part of the country. Here are to be found wonderful, shapely volcanic peaks, three of which are snow-crowned all the year, even in a region where the limit of the eternal snows is 15,000 feet. These three are *Orizaba,* which the ancients called Citlaltepetl, or Star Mountain, the tallest peak in the country, 18,250 feet in height; the famous *Popocatepetl,* or Smoky Mountain, 17,520 feet in height; and *Iztaccihuatl,* or White Woman, 16,960 feet, from whose snow crown great glaciers push downward. There are other peaks, also, and most of them are volcanic; but there is one small volcano, only 4,330 feet in height, which has a peculiar fame. *Jorullo,* it is called, and ac-





ELEVATION ACROSS MEXICO

The irregular black line across the lower map is the path of the cross section shown above from ocean to ocean, from Vera Cruz on the east to Manzanillo on the west.

cording to the story of the natives it rose above the plain in a single night of terrific activity, late in 1759. Most of the Mexican volcanoes are extinct, but some of the famous ones still show signs of life, sending out constant jets of steam and gas which melt the snow around their crater mouths.

The two peninsulas of Mexico are very different in character. Lower California is an arid, sandy region, with a backbone of mountains which reach a considerable height; while Yucatan is very flat and level, throughout most of its extent not far from 100 feet in altitude.

Waters. Once upon a time Mexico had a great river, the Rio Grande, entirely within its borders; but when a large stretch of territory was given up to the United States after the Mexican War in 1848, this river was made the boundary line between the two republics, and now the river belongs in part to each. So much of its water is drawn off to irrigate the dry land through which it flows that through part of the year it is little more than a sand bed. Of other rivers there are few of any importance, the great plateau with its bordering mountains making streams of any length impossible. Occasional rapid torrents descend to the sea from the plateau, but the unequal distribution of the rainfall throughout the year and the absence of forests make of them flood streams at certain seasons and dry gullies at others. It may be said almost literally, therefore, that Mexico has no inland water transportation.

The country is not much better supplied with lakes, though some of the plateau valleys have chains of lakes, which seem slowly to be drying up, and the coast regions have in places tide-water lagoons. The only lake of any considerable importance is Chapala, which has a length of eighty miles and a breadth of from ten to thirty-five miles. It is one of the favorite resort regions for wealthy Mexicans, whose attractive country houses line its shores.

Climate. Parts of Mexico, in the moist, fever-breeding lowlands along the coast, have a very unhealthful, as well as disagreeable, climate, but throughout much of the country climate conditions are exceedingly attractive. Since the country stretches through seventeen degrees of latitude, it presents considerable variations in climate, but it is altitude rather than latitude that causes the differences. There are three distinct zones of climate which depend upon elevation. Along the coast, and extending to a height of about 3,300 feet, are the *tierras calientes,* or hot lands, which have an average yearly temperature of from 77° to 82°, and rarely reach lower than 60°. Next are the *tierras templadas,* or temperate lands, from 3,300 to 5,600 feet above sea level, which have an average temperature of from 62°to 70° and produce the crops of subtropical regions as well as those of temperate climes. Above these are the so-called *tierras frias,* or cold lands, but in reality they are not cold at all, as they seldom experience a frost. It is in the lower regions of these cooler lands that the population is densest.

The rainfall is extremely uneven, much of the plateau having only from twenty-five to thirty inches in a year, while the coastal regions of the east have as high as 120 inches.

MEXICO
Scale of Miles
0 50 100 200 300 400 500
Railroads
Railroads Projected
Size of type indicates relative importance of places
Principal through railroads
Principal water route
C.S HAMMOND & CO., N.Y.
Longitude 104° West from 100° Greenwich
UNITED STATES
GULF OF MEXICO
PACIFIC OCEAN
CALIFORNIA
GULF OF CALIFORNIA
REVILLAGIGEDO ISLANDS
GULF OF CAMPECHE
YUCATAN CHANNEL
CUBA
BELIZE
GUATEMALA
HONDURAS
NICARAGUA
SAN SALVADOR
NEW GUATEMALA
TEHUANTEPEC
ISTHMUS OF TEHUANTEPEC
Gulf of Honduras
TROPIC OF CANCER
TO SAN DIEGO
TO NEW YORK
TO BALTIMORE
TO NEWPORT NEWS
TO CHARLESTON
Mexico City
Monterey
Guadalajara
Puebla
Vera Cruz
Tampico
Mazatlan
Durango
Chihuahua
Saltillo
San Antonio
Galveston
New Orleans
Houston
Monterey
Merida
Campeche
Progreso
Belize
Puerto Cortez
Tegucigalpa
Guatemala
Acapulco
Oaxaca
Guaymas
Hermosillo
La Paz
Mazatlan
Tepic
Colima
Morelia
Guanajuato
Querétaro
San Luis Potosi
Aguascalientes
Zacatecas
Durango
Torreon
Monclova
Laredo
Corpus Christi
Brownsville
Matamoros
Monterrey
Victoria
Tampico
Vera Cruz
Jalapa
Puebla
Oaxaca
Tehuantepec
Acapulco
Salina Cruz
Tuxtla
Ciudad Porfirio Diaz
Eagle Pass
Del Rio
El Paso
Presidio del Norte
Ojinaga
Chihuahua
Parral
Hidalgo del Parral
Ciudad Juarez
Nogales
Guaymas
Hermosillo
Altar
Magdalena
Caborca
Santa Rosalia
Loreto
Mulege
Santa Rosalia
Guerrero Negro
Ensenada
San Diego
Yuma
Tucson
Douglas
Lordsburg
Silver City
Deming
Sierra Blanca
Pecos
Fort Worth
Dallas
Shreveport
Vicksburg
Jackson
Meridian
Montgomery
Mobile
Pensacola
Tallahassee
Apalachicola
Baton Rouge
Beaumont
Galveston
Sabine
Port Lavaca
Corpus Christi
Laredo
Eagle Pass
San Antonio
Austin
Waco
Fort Worth
Dallas
Longview
Texarkana
Sweetwater
Cisco
Abilene
San Angelo
Ft. Stockton
Pecos
Sierra Blanca
El Paso
Rio Grande
Spofford
Uvalde
Del Rio
Ojinaga
Presidio del Norte
Moctezuma
Gallego
Agua Nueva
Temosachic
Chihuahua
Torreon
Monclova
Laredo
Nuevo Laredo
Matamoros
Brownsville
Monterrey
Victoria
Tampico
Vera Cruz
Jalapa
Puebla
Oaxaca
Tehuantepec
Acapulco
Salina Cruz
Tuxtla
Ciudad Porfirio Diaz
Eagle Pass
Del Rio
El Paso
Presidio del Norte
Ojinaga
Chihuahua
Parral
Hidalgo del Parral
Ciudad Juarez
Nogales
Guaymas
Hermosillo
Altar
Magdalena
Caborca
Santa Rosalia
Loreto
Mulege
Santa Rosalia
Guerrero Negro
Ensenada
San Diego
Yuma
Tucson
Douglas
Lordsburg
Silver City
Deming
Sierra Blanca
Pecos
Fort Worth
Dallas
Shreveport
Vicksburg
Jackson
Meridian
Montgomery
Mobile
Pensacola
Tallahassee
Apalachicola
Baton Rouge
Beaumont
Galveston
Sabine
Port Lavaca
Corpus Christi
Laredo
Eagle Pass
San Antonio
Austin
Waco
Fort Worth
Dallas
Longview
Texarkana
Sweetwater
Cisco
Abilene
San Angelo
Ft. Stockton
Pecos
Sierra Blanca
El Paso
Rio Grande
Spofford
Uvalde
Del Rio
Ojinaga
Presidio del Norte
Moctezuma
Gallego
Agua Nueva
Temosachic
Chihuahua
Torreon
Monclova
Laredo
Nuevo Laredo
Matamoros
Brownsville
Monterrey
Victoria
Tampico
Vera Cruz
Jalapa
Puebla
Oaxaca
Tehuantepec
Acapulco
Salina Cruz
Tuxtla

MEXICO

AREA AND POPULATION

States and Territories	Area Sq. M.	Population Census, 1910	Population Estimate, 1912	Population Per Sq. M.	Leading Industries	Capital	Population 1910
Aguascalientes	2,950.	120,511.	124,500.	40.6.	Mining	Aguascalientes	45,198
Baja (Lower) California (T.)	58,328.	52,272.	53,254.	0.8.	Cattle-raising, mining	Esenada, N. Dist La Paz, S. Dist	2,170 5,336
Campeche	18,087.	86,661.	86,665.	4.7.	Exportation of logwood	Campeche	16,775
Chiapas	27,222.	438,843.	456,371.	16.1.	Agriculture	Tuxtla Gutiérrez	10,239
Chihuahua	87,802.	405,707.	423,400.	4.6.	Mining	Chihuahua	39,706
Coahuila	63,569.	362,092.	376,800.	5.7.	Agriculture, mining	Saltillo	35,414
Colima	2,272.	77,704.	80,500.	34.2.	Agriculture, stock-raising	Colima	25,148
Durango	38,009.	483,175.	509,600.	12.8.	Mining, agriculture	Durango	31,766
Federal District of Mexico	463.	720,753.	763,200.	1556.8.	Manufacturing	Mexico City *	471,063
Guanajuato	11,370.	1,081,651.	1,085,700.	95.1.	Mining	Guanajuato	35,682
Guerrero	24,996.	594,278.	620,400.	20.1.	Mining	Chilpancingo	7,994
Hidalgo	8,917.	646,551.	655,187.	74.7.	Agriculture, mining	Pachuca	39,009
Jalisco	31,846.	1,208,855.	1,220,200.	37.9.	Agriculture, mining	Guadalajara	119,468
Mexico	9,247.	989,510.	1,000,900.	107.0.	Agriculture	Toluca	31,023
Michoacán	22,874.	991,880.	1,003,490.	43.3.	Mining	Morelia	40,042
Morelos	2,773.	179,594.	183,705.	60.4.	Manufacturing	Guernavaca	12,776
Nuevo León	23,592.	365,150.	373,207.	15.4.	Agriculture, mining	Monterey	78,528
Oaxaca	35,382.	1,040,398.	1,059,789.	29.3.	Agriculture, mining	Oaxaca	38,011
Puebla	12,204.	1,101,600.	1,118,439.	90.2.	Agriculture	Puebla	96,121
Querétaro	3,556.	244,663.	247,195.	68.8.	Agriculture, mining	Querétaro	33,062
Quintana Roo (T.)	18,876.	9,109.	9,328.	0.4.	Chicle gathering	Chansantacruz	2,000
San Luis Potosi	25,316.	627,800.	638,832.	24.7.	Mining, stock-raising	San Luis Potosi	68,022
Sinaloa	33,671.	323,642.	329,317.	9.6.	Mining, agriculture	Culiacán	13,527
Sonora	76,900.	265,383.	275,107.	3.4.	Mining	Hermosillo	14,578
Tabasco	10,072.	187,574.	193,675.	18.6.	Agriculture	San Juan Bautista	12,327
Tamaulipas	32,128.	249,641.	256,278.	7.7.	Agriculture, mining	Victoria	12,103
Tepic (T.)	11,275.	171,173.	175,731.	15.1.	Agriculture	Tepic	16,778
Tlaxcala	1,595.	184,171.	186,642.	115.4.	Agriculture	Tlaxcala	2,812
Vera Cruz	29,201.	1,132,859.	1,165,931.	38.7.	Agriculture	Jalapa	24,816
Yucatán	35,203.	339,613.	347,781.	9.6.	Agriculture	Mérida	62,447
Zacatecas	24,757.	477,556.	480,690.	19.2.	Mining, agriculture	Zacatecas	29,900

* Capital of Mexico.

IMPORTS AND EXPORTS OF PRINCIPAL PORTS

Port of Entry	State or Territory	Location	Imports 1911	Imports 1912	Exports 1911	Exports 1912
Acapulco	Guerrero	Pacific Ocean	$ 705,403.	$ 459,580.	$ 282,745.	$ 431,766
Carmen	Campeche	Gulf of Campeche	256,688.	236,022.	3,521,963.	3,038,937
Ciudad Juarez	Chihuahua	Rio Grande River	12,710,202.	7,638,994.	29,286,878.	7,800,109
Ciudad Porfirio Diaz	Coahuila	Rio Grande River	9,463,477.	5,327,495.	21,132,895.	13,912,402
Esenada	Baja (Lower) California	Todos Santos Bay		399,258.		312,174
Frontera	Tobasco	Gulf of Campeche	1,190,050.	1,019,620.	1,767,951.	2,083,321
Guaymas	Sonora	Gulf of California	2,991,758.	2,767,449.	1,255,897.	2,925,528
La Paz	Baja (Lower) California	La Paz Bay		225,461.		523,212
Manzanillo	Colima	Pacific Ocean	1,516,239.	1,913,565.	121,495.	540,766
Matamoras	Tamaulipas	Rio Grande River	893,243.	2,054,651.	413,259.	417,060
Mazatlan	Sinaloa	Gulf of California	3,281,104.	2,770,808.	1,931,891.	3,133,242
Nogales	Sonora	Arizona boundary	3,748,969.	2,761,584.	10,681,762.	11,639,337
Progreso	Yucátan	Gulf of Mexico	7,799,362.	8,485,107.	26,115,264.	20,891,115
Puerto Mexico	Vera Cruz	Coatzacoalcos Bay	2,577,173.	3,620,034.	2,941,965.	3,807,689
San Blas	Tepic	Pacific Ocean	280,765.	181,139.	147,055.	246,327
Santa Rosalia	Baja (Lower) California	Gulf of California		1,595,848.		6,800,743
Tampico	Tamaulipas	Gulf of Mexico	44,164,201.	38,227,897.	92,562,913.	92,756,409
Topolobampo	Sinaloa	Gulf of California	128,156.	141,233.	575,215.	719,625
Tuxpam	Vera Cruz	Tuxpam Bay	90,989.	159,578.	556,111.	621,324
Vera Cruz	Vera Cruz	Gulf of Mexico	77,076,707.	72,910,748.	53,662,797.	87,579,481

RIVERS, LAKES AND MOUNTAINS

Rivers	Outlet	Length Miles	Lakes and Lagoons †	Location	Mountains	Altitude Feet	Location
Balsas	Pacific Ocean	430	Agua Verde	Coahuila	Cerro Pimal	11,319.	Zacatecas
Conchas (Conchos)	Rio Grande River	300	Chapala	Jalisco	Cofre de Perote	13,419.	Vera Cruz
Fuerte	Gulf of California	340	Coyote	Coahuila	Colima, Nevado de	14,363.	Jalisco
Grijalva	Gulf of Mexico	350	Cuitzéo	Michoacán	Colima, Volcan de	12,750.	Jalisco
Hondo *	Chetumal Bay	150	Lacondones	Chiapas	Ixtaccihuatl	17,343.	Puebla
Nazas	Laguna de Parras	370	Madre	Tamaulipas	Malinche	14,636.	Tlaxcala
Pámico	Gulf of Mexico	275	Magdalena	Jalisco	Nevado de Toluca	15,168.	Toluca
Rio Grande *	Gulf of Mexico	1,500	Patzcuaro	Michoacán	Orizaba	18,209.	Puebla and Vera Cruz
Salado	Rio Grande River	225	San Cristobal	Michoacán	Popocatepetl	17,888.	Puebla
Santiago (Lerma)	Pacific Ocean	540	Tamiahua	Vera Cruz	San Martin	9,708.	Vera Cruz
Usmacinta	Grijalva River	330	Terminos	Campeche	Sierra de Ajusca	13,078.	Inter-state cluster
Yaqui	Pacific Ocean	390	Texcoco	Mexico	Tancitaro	12,660.	Michoacán

* Boundary rivers. † The lakes of Mexico are small and include two classes, (a) those of the plateau region which occupy lacustrine depressions, and (b) tide-water lagoons.

Resources and Industries

Minerals. A mention of the minerals of Mexico recalls thoughts of early days when the Spaniards came seeking the precious metals which they had heard that the country possessed in fabulous quantities. The adventurers from Spain were not deceived in their dreams, for few countries in the world have vaster mineral resources. Much gold is there, and though for years the expense of mining it prevented large production, the output has in recent years increased very decidedly. But the great mineral is silver, of which Mexico, when not torn by revolutions, produces thirty per cent of the world's supply. Every state has its silver mines, but they are richest and most numerous in the southern part of the plateau. There is copper, too, and iron in great quantities, with lead, tin and sulphur, but the production of all of these is hampered by lack of fuel. Mexico has coal beds, but they are so far from transportation lines that they cannot be worked with profit, and most of the coal is imported from England or the United States and sold at as much as $20 a ton. Needless to say, most of the people burn some other fuel, but wood is very little cheaper. Within the last two decades petroleum has been discovered, and is now being produced in great quantities. Tampico is the center of this industry, and the Tampico fields were the main source of supply for Britain's war vessels during the War of the Nations.

Vegetable Growth, and Agriculture. The Spaniards were throughout much of their occupation so deeply interested in mining that they paid little attention to tilling the soil, so agricultural pursuits gained slowly. Even in those days, however, the value of many of the native forms of plant life was recognized. The dense tropic forests of the hot lands have palms and acacias, mahogany, rosewood, ebony and ironwood trees, and olives and almonds, while higher up grow oaks, pines and firs. Other trees, not native, have been introduced, and large plantations of rubber trees promise a growth of the rubber industry. Then there is the agave, or American aloe, a spinous, unfriendly-looking plant which forms the basis for two of the chief industries of the country. From one species is produced a fiber known as sisal hemp, which is exported in great quantities; from another a white juice which ferments to form a very intoxicating liquor—the *pulque* which is the national drink of the Mexicans and the cause of much of their unprogressiveness.

The crops are many and of great variety. Coffee, cotton, sugar cane, tobacco, corn, the favorite frijole beans, wheat, vanilla, indigo—in fact, almost anything which will grow in temperate or tropic climates thrives somewhere in Mexico. There are also fruits—apples in the highlands, and lemons, oranges, bananas and pineapples in the warmer parts. Even with all these, the development of Mexico's resources has but begun. The great lack is water, but when this can be drawn from the mountains and given by irrigation to the fertile but dry plateau lands, Mexico will indeed blossom like the rose.

Stock-raising has always been of importance since early Spanish days, and to-day it is one of the chief industries. The Mexican cowboy is as fearless and as skilful in managing his great herds as is his brother in the United States, and it was from the Mexicans that the American cowboy learned the use of the lasso. The cattle, horses and sheep are for the most part small and of rather inferior grade, but in recent years much has been done toward improving the various breeds.

Manufactures. One thing which President Diaz did for Mexico during his rule of over thirty years was to make conditions secure enough so that manufacturing might make some headway, for before his time Mexico was distinctly a nonmanufacturing country. Even to-day few articles are manufactured in sufficient quantities for export, but there was a decided advance, which was nearly stopped by the revolutions after 1911. Cotton cloth, tobacco, sugar, liquors, woolen goods of inferior quality, glass, chocolate and molasses are some of the chief articles of manufacture. Such distinctive products as the high-crowned, wide-brimmed hats; the elaborate saddles; and the pottery, baskets, mats and feather work of the Indians are on sale in every market place, and form part of the return baggage of nearly every visitor to Mexico.

Transportation and Commerce. After the first railroad, a very short line, was built in Mexico in 1854, development was slow for a score of years. Since that time the lines have been rapidly extended and improved, and at present there is in the country a total of about 16,000 miles. All the important cities have rail connection, and Mexico City is a busy railroad center. The government owns a controlling share in most of the large lines, and the plan

NATIONAL PALACE, CITY OF MEXICO

is that sooner or later all the roads shall be government owned. The large cities also have street railways, some of them operated by electric power, some by more primitive means.

Because of its large production of metals, the exports of Mexico surpass its imports, for each year about $95,000,000 worth of minerals are sent out. The total exports, which include sisal hemp, hides, coffee, building woods, cattle and rubber, amount in a year to about $150,000,000, while the imports, consisting largely of textiles, machinery and foodstuffs, are valued at nearly $100,000,000 in normal times. The United States furnishes about one-half of the imports and receives over three-fourths of the exports, Great Britain ranking second.

Government and History

The Constitution. The first constitution was adopted on February 5, 1857, the second, in May, 1917, after General Carranza had partially pacified the country (see *History*, below). It provides for the Federal republic as it has long existed, consisting of twenty-seven states, three territories, and a Federal District. The latter comprises the capital, Mexico City, and adjoining territory. Of the individual states it demands that they, too, have representative republican governments, but it leaves them nearly supreme in local affairs. The new constitution is particularly displeasing to the United States, as it limits the enterprise of Americans and Europeans in the republic.

Departments of Government. At the head of the republic is a President, chosen for a term of four years, by electors who are selected by popular vote. There is no Vice-President. Though given by the Constitution only such powers as are usual to the President of a republic, the Presidents of Mexico have practically all been dictators, supreme while they held their power. To assist the chief executive in his functions there is a Cabinet composed of the heads of the eight departments of foreign relations, interior, justice, public instruction and fine arts, industry and colonization, communication and public works, finance, and war and marine.

The legislative branch consists of two houses, a Senate and a Chamber of Deputies. Senators, one-half of whom are elected every two years, hold office for four years and are fifty-six in number, two being chosen from each state and two from the Federal District; representatives, one of whom is elected for each 40,000 inhabitants or fraction thereof over 20,000, are elected for two years.

At the head of the judiciary is a supreme court of fifteen judges, elected for six-year terms, and below this there are district and

circuit courts, while each state has its supreme and inferior courts.

Cities. The largest city of Mexico is Mexico City, and it is also the capital. Other cities are Guadalajara, Puebla, San Luis Potosi, Merida, Aguas Calientes, Morelia, Chihuahua, Guanajuato, Leon, Vera Cruz, Saltillo, Oaxaca, Juarez and Pachuca. The most important of these are given separate articles in these volumes.

Early History. The name *Mexico* is probably derived from that of the old war god, *Mexitl,* who was worshiped by the Aztecs. These were not the first dwellers in Mexico, but are supposed to have entered the country late in the twelfth century. Wonderful indeed was the civilization they built up about their capital city of Tenochtitlan, which stood where Mexico City stands to-day; but with all their power they were not strong enough to resist the conquerors who came early in the sixteenth century. These were the Spaniards, who under their famous warrior-leader, Cortez, overthrew Montezuma, the Aztec emperor, and made themselves masters of the city. In all the history of the Western world there is no more thrilling chapter than that which describes the heroic fight of the Aztecs against the invaders. See CORTEZ; MONTEZUMA.

The Spanish Period. Cortez called this land which he had won *New Spain,* and of it he was made captain-general. For just three centuries after he conquered it in 1521 it remained Spanish territory. Spaniards flocked to the promising new country, and in 1535 the first viceroy was appointed. But though in the long line of his successors there were some good men, the Spanish policy on the whole was selfish, permitting the exploitation of the country by the Spanish nobles. Decided advance was made along certain lines, however, for exploring parties were sent out into the lands to the north which now form part of the United States, and Christianity was introduced among the Indians of these regions as well as among those of Mexico.

The selfishness and the oppressive measures of Spain led to constant and ever-increasing restlessness and discontent, which culminated in 1810 in open revolt. The leader of this insurrection was a parish priest, Hidalgo, who took as his motto, "Long live America, and death to bad government!" The defeat and death of Hidalgo did not put a stop to the rebellion, which flamed more and more fiercely until, in 1821, independence was assured.

Freedom. Mexico was free, but it had no ruler, and embassies were sent to Europe to try to induce a prince of the House of Bourbon to accept the throne; for as yet a republic was not thought of. No one could be found, however, and in 1822 Iturbide, the general who had had most to do with securing independence, had himself proclaimed emperor. All parties did not favor his claims, and in the next year he was forced to resign, and in 1824 a republic was formally proclaimed. The troubles of the country had but just begun. The people were not used to governing themselves and did not know how, and force of arms rather than the ballot usually decided an election. Presidents were forced out of office by revolts; other Presidents refused to give up the office when their terms had expired, and only a very strong man with the powers of a dictator could give to the country even a semblance of peace. One of these dictator Presidents who held the affairs of the country in his hands for a long time was Santa Anna (which see), and he was still in the forefront when war broke out with the United States.

Texas had made itself independent in 1836, and ten years later disputes over boundaries led to war with the United States. Nothing can give a clearer idea of the troubled conditions in Mexico than the fact that during the war, which lasted but two years, the Presidential chair was vacated and refilled twelve times. Naturally, the fighting force could not be effective with such a state of affairs behind it, and by the treaty which closed the war Mexico surrendered all of New Mexico, which included a vast extent of territory not included in the present American state of New Mexico.

Still the internal disorder kept up, one man after another coming to the fore, ruling for a time with a high hand and sinking into the background again. Most noteworthy of these middle-of-the-century dictators was Juarez, a full-blooded Indian, who showed himself possessed of very unusual powers. His hold upon Mexico was loosened in 1862 when a French army entered the country, and in the following year Mexico was proclaimed an empire and its crown was offered to Maximilian, archduke of Austria. His rule, though honest and wise, was not popular in the country, and when the French troops were withdrawn early in 1867 he found himself utterly without backing. Insurrection broke out, and the unfortunate emperor, betrayed by a trusted general, was captured and put to death.

THE CITY OF PARRAL

Typical of the architecture of the interior towns of the republic, and interesting to Americans, as the city was the southernmost point reached by the expedition of General Pershing.

The Great Dictator. This title belongs by right to Porfirio Diaz, who became President in 1876. With his advent began the first period of real development for Mexico. Under him the government was not the weak, uncertain affair that most of the Presidents had made it, and peace, though founded upon fear, was nevertheless a real thing for the first time since the declaration of the republic. Since there was a law which declared that a President could not serve a second term, Diaz was not reëlected in 1880, but it became clear that he was the man the country needed, and the laws were changed to permit of his continuous reelection. Until 1911 he held office, and a prosperity unknown before descended upon Mexico. Industries were developed; foreign capital poured into the country, since there was a feeling that the government was strong enough to protect it; an educational policy was mapped out; everywhere new public buildings came into being—in a word, Mexico was in a fair way to become a thriving, modern nation.

Civil War. But the rule of Diaz, though benevolent in the main, could not please everyone, and late in 1910 a revolution, headed by Francisco Madero, broke out. This resulted, in the following year, in forcing Diaz to resign and to flee to Europe, while Madero was elected President. But the spirit of insurrection was in the air, revolts broke out on all sides, one of which grew to such proportions as to compel the resignation of Madero and his Vice-President early in 1913. Four days after his resignation Madero was murdered, and General Huerta, who had headed the revolt, became President. The United States refused to recognize the government of Huerta, and strained relations between the two countries ensued, but President Wilson proclaimed a "watchful waiting" policy, and actual intervention did not take place at that time.

Here and there throughout the country revolution and counter-revolutions were in progress, Venustiano Carranza and Francisco Villa playing specially important parts. To paraphrase Kipling, it appeared that Mexico was rapidly

INTERNATIONAL BRIDGE

The wooden structure between El Paso and Juarez, over the Rio Grande. It has become famous since relations between the two countries were less cordial than formerly.

drifting toward a condition where "Never a law of God or man runs south of thirty-two." The lives and property of citizens of other countries living in Mexico were constantly being threatened, and in April, 1914, the arrest

OUTLINE AND QUESTIONS ON MEXICO

Outline

I. Position and Size

(1) In southern part of North America
(2) Latitude
(3) Longitude
(4) Neighboring countries and boundaries
(5) Area
  (a) Actual—767,055 square miles
  (b) Comparative

II. Physical Features

(1) Coast line
  (a) Length
  (b) Character
(2) Three surface regions
  (a) Central plateau
  (b) Border ranges
    1. Sierra Madre Oriental
    2. Sierra Madre Occidental
    3. Outstanding peaks
(3) Coastal lowlands
(4) Two peninsulas
  (a) Yucatan
  (b) Lower California
(5) The Rio Grande
(6) Absence of other important streams
(7) Scarcity of lakes

III. Climate

(1) Unhealthful lowlands
(2) Attractive plateau conditions
(3) Three climatic zones
(4) Rainfall

IV. Industries and Commerce

(1) Mining
  (a) Part taken by gold mining in history of country
  (b) Other minerals
(2) Agriculture
  (a) Great variety of crops
  (b) Slow development
  (c) Stock raising
(3) Slight development of manufactures
(4) Exports and imports
(5) Transportation

V. The People

(1) Racial variations
(2) Characteristics
(3) Living conditions
(4) Education
(5) Religion

VI. Government and History

(1) Republican form
  (a) Departments
(2) Early history
(3) Spanish period
(4) The republic
  (a) Troubled conditions
  (b) The "great dictator"
  (c) Recent civil war

Questions

What constitutes the chief food of the mass of people in Mexico?

How does it happen that this country, which once had a great river within its borders, no longer has it?

How many Presidents did Mexico have during the Mexican War?

What are the *tierras calientas?* The *tierras templadas?* Locate them both.

What part did the "A B C powers" take in the history of Mexico?

When was a mountain built in a night?

When and under what circumstances was "Death to bad government" a rallying cry?

How large a proportion of the Mexicans have Indian blood in their veins? How does this influence the character of the people?

What has been the great force in the making of Mexico geographically?

From what was the name *Mexico* probably derived?

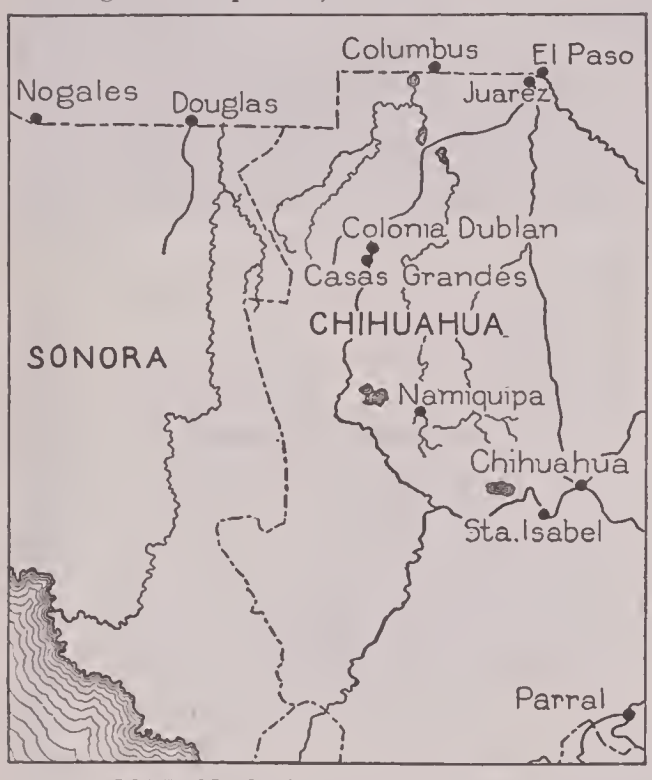
How many nations of the Western hemisphere have a larger area?

How does the coast line compare in length with that of the United States?

What resource of the country brought its first European visitors?

What has hampered the development of agriculture? Of mining?

of a number of United States marines at Tampico led to the despatching of the American fleet to the Gulf of Mexico. War seemed imminent, but it was finally averted by the friendly intercession of the so-called "A B C" powers—Argentina, Brazil and Chile. In July, 1914, Huerta resigned, and Carranza became Provisional President, but Villa, heretofore his adherent, refused to support his claims, and Zapata also set up an independent government in the south. There seemed no solution of the vexed problem; the recognition by the United States of Carranza as *de facto* President did little to settle the matter. Villa, his hand against all parties, became more and more



MAP OF CHIHUAHUA STATE
Location of the events connected with the expedition from the United States in 1916.

daring in his depredations, and at length made it evident that he had no more respect for the authority of the United States than for that of his successful rivals in his own country. Finally, early in 1916, he began crossing the border into Texas and New Mexico, and there on his raids, particularly at Columbus, N. M., on March 8, put to death peaceful American citizens. In March the United States government sent troops into Mexico under Generals Funston and Pershing to capture the bandit chief. The direct command of 12,000 men, under Pershing, penetrated 500 miles below the Rio Grande and remained there inactive until February, 1917, when the government of the United States ordered it home. Official inaction, due to friction with official Mexico, made it impossible to accomplish what it was sent to perform. Over 100,000 state militiamen were mobilized and sent to the border for patrol duty, and no state's quota remained there less than six months; many regiments were yet there in September, 1919, owing to threatened trouble between the Carranza followers and those of Villa which might jeopardize American interests along the border. In June, 1919, American troops drove Villistas from Juarez.

On May 1, 1917, a new constitution went into effect, the result of many weeks of work on the part of the Carranza government. During April a national election was held, and Carranza was elected President of the republic. The last constitutional President had been Madero, who was assassinated February 22, 1913, by the Huerta régime. A.MC C.

Consult Turner's *Barbarous Mexico;* Lummis's *The Awakening of a Nation;* Fornaro's *Carranza and Mexico;* Reed's *Insurgent Mexico.*

Related Subjects. The following articles in these volumes will give more detailed information on certain phases of Mexican geography and life:

CITIES

Acapulco
Aguas Calientes
Campeachy
Chihuahua
Durango
Guadalajara
Guanajuato
Leon
Mexico
Monterey
Morelia
Puebla
San Luis Potosi
Tampico
Vera Cruz
Zacatecas

HISTORY

Aztecs
Carranza, Venustiano
Cortez, Hernando
Diaz, Porfirio
Huerta, Victoriano
Iturbide, Agustin de
Juarez, Benito Pablo
Madero, Francisco
Maximilian
Mexican War
Montezuma
Santa Anna, Antonio Lopez de
United States, subtitle *History*
Villa, Francisco

LEADING PRODUCTS

Cattle
Coffee
Copper
Gold
Horse
Pulque
Rubber and Rubber Manufacture
Sheep
Silver
Sisal

MOUNTAINS

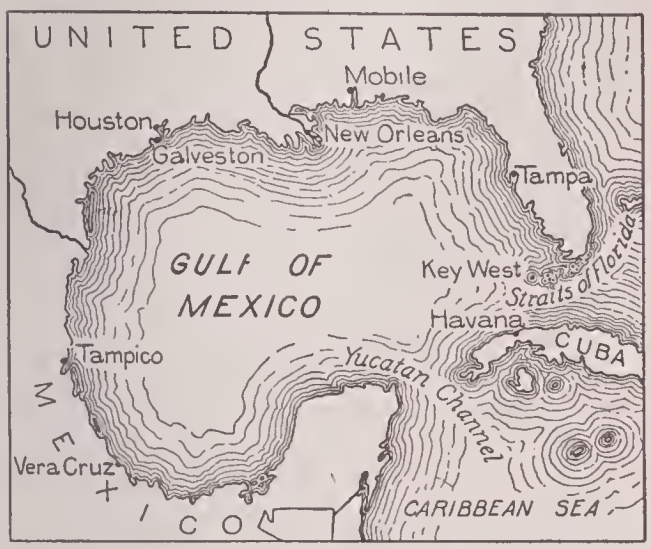
Popocatepetl
Sierra Madre

UNCLASSIFIED

California, Lower
Rio Grande
Tehuantepec, Isthmus of
Yucatan

MEXICO, Gulf of, a great arm of the Atlantic Ocean which forms what is in effect a huge inland sea on the eastern coast of North America. It is almost entirely surrounded by the United States and Mexico. The southern-

most tip of the Florida peninsula and the northeasterly point of Yucatan are 450 miles apart; a line drawn between these points marks roughly the southern limits of the Gulf, where it joins the Caribbean Sea. Midway in the



LOCATION MAP

opening between Florida and Yucatan lies the island of Cuba, and the open sea is reached only by means of two passes, the Straits of Florida and Yucatan Channel. This great oval basin, with an east and west length of 1,100 miles, a breadth of 800 miles and an area of almost 700,000 square miles, has 3,000 miles of low, level coast line, broken only by countless lagoons and salty marshes shut off by the sand bars. The low, sandy shores make few good harbors, but the Gulf possesses the important ports of Vera Cruz, Galveston, Mobile, Pensacola, Tampa and Havana.

Off the coast of Mexico the depth of water is in places 12,700 feet (nearly two and a half miles), while over a large area in that vicinity it averages 12,000 feet, but elsewhere 10,000 feet is the maximum. The Yucatan Channel and the Straits of Florida are not nearly so deep, and there are many shallow places with gently-sloping bottoms, where the rivers pour in their sediment. Chief of these rivers is the Mississippi; others which pour their floods into the Gulf are the Rio Grande, the Colorado of Texas, the Mobile and the Apalachicola. On the low coast of Florida and Yucatan there are numerous little "keys," as they are called, but save for these and Cuba the Gulf has no islands.

No feature about the Gulf of Mexico is more noteworthy than the Gulf Stream. Entering from the Caribbean Sea by the Yucatan Channel, it flows about the coast, raising the temperature of the Gulf eight or nine degrees above that of the Atlantic in the same latitude, and finally issues into the Atlantic by way of the Straits of Florida. It is difficult to overestimate the influence of the Gulf of Mexico on the climate of the surrounding region, or even on that of places far to the northward. Many places in the Mississippi Valley have a warmer climate than would be possible were it not for the warm winds which sweep up from the Gulf, while the spring rains which flood the tributaries are due in large measure to the moisture-bearing breezes from the south. See GULF STREAM. A.MC C.

MEXICO CITY, the metropolis of Spanish-speaking North America and the capital of the republic of Mexico, is one of the most interesting cities of the Western world. Founded by the Aztecs more than a century and a half before Columbus started on his first voyage towards the Americas, it has grown from an Indian village of mud and rush huts to an imposing city of over 470,000 inhabitants. Its founders selected a site of unusual beauty. The city is built on a plateau lying on the west side of a great circular basin 2,220 square miles in area, on the rim of which rise lofty mountains and snow-capped volcanoes. The waters which through the past centuries have made their way down the mountain slopes into the valley have collected in shallow basins and formed six lakes which dot the surface of the plain.

Mexico City is 7,350 feet above the level of the sea, over 2,000 feet higher than Denver; it lies 263 miles west of Vera Cruz, on the Gulf of Mexico, and 290 miles northeast of Acapulco, on the Pacific coast. El Paso, Tex., a storm center of the border disturbances of the year 1916, is 1,224 miles to the northwest; Laredo, in the same state, and another frontier town, is about 840 miles directly north. Mexico City is connected by railroad with nearly all the Mexican state capitals and principal ports.

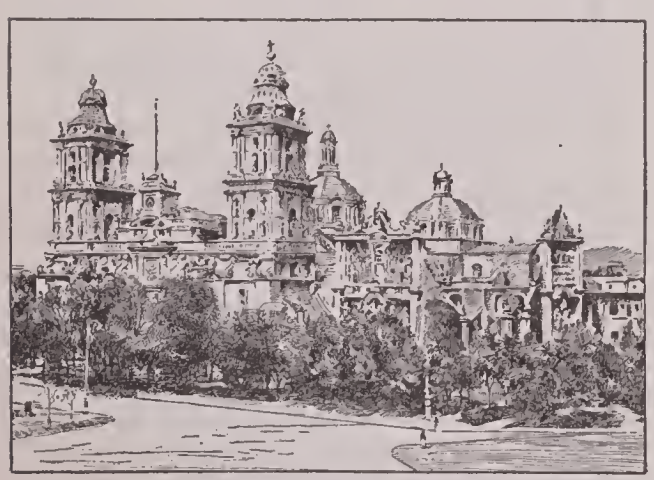
Streets and Buildings. For three centuries after the conquest of Mexico by Cortez, the country was under Spanish rule, and the capital city still has many features that suggest the great cities of the mother country. The dwelling houses, built of sandstone or lava, and but one or two stories in height, are rendered picturesque and charming by their terraced roofs and inner courts. Because of the frequency of earthquake shocks tall structures are not to be found in Mexico City, and the tallest office buildings rise no higher than five stories. Steel is used to a considerable extent in modern con-

struction, and some of the older buildings lining the business streets present a curious contrast to the newer ones by reason of their leaning walls, rocked out of plumb by repeated shocks.

The city is laid out with regularity, and the streets in the newer districts are paved with stone and asphalt and lighted with gas or electricity. A visitor strolling down San Francisco Avenue, the main business thoroughfare, might well fancy himself in some fashionable quarter of an up-to-date Spanish city. Here are located the finest shops, hotels, restaurants, business offices and clubs. The most aristocratic street of the city, and the center of its social life, is the Paseo de la Reforma, a magnificent boulevard lined with handsome residences and fine trees.

Of the many squares and open spaces, the Alameda, or public gardens, covering an area of forty acres, and the Plaza Mayor are of special interest. The latter, a plot of fourteen acres, beautified by trees, flowers, marble fountains and statuary, is surrounded by a great Roman Catholic cathedral, the National Palace, the municipal buildings and some of the largest retail stores. On this square are held the patriotic celebrations, military concerts and various outdoor spectacles in which the Mexican people take great delight.

The cathedral, built on the site of an ancient Aztec temple, is one of the largest and most elaborate churches in North America. There are in the city about sixty other Roman Catholic churches, and a number of Protestant



THE CATHEDRAL

houses of worship. The offices of the President of Mexico, the Senate Chamber, the War and Finance departments and the national Treasury are located in the National Palace, while the city government offices are housed in the Municipal Palace, which faces the cathedral. North of the National Palace is the National Museum, containing, among other important collections, a group of Aztec relics of priceless value. Notable among the city's modern buildings are the Legislative Palace, built at a cost of 10,000,000 pesos (in normal times about $5,000,000), the central post office, costing nearly $2,000,000, and the finely-equipped national penitentiary, located on the eastern border of the city. Of special interest among the older buildings are the National Picture Gallery, the National Library, containing over 200,000 volumes, the Hospital Jesus Nazerino, established by Cortez in 1524, and a small building in which was done the first printing in America. See AZTEC; CORTEZ.

Education and Industries. The educational interests of the city are well provided for. The Mexican government maintains the University of Mexico, which, as reorganized in 1910, is at the head of the educational system of the republic. Under government control also are a large number of primary and secondary schools, an excellent college-preparatory school, technical, professional, normal and industrial schools. There are in addition about 200 private schools.

Industrially, Mexico City has developed notably within recent years, largely because of the development of electric power. There are at the present time over 150 manufacturing establishments in the city, producing linen, cotton and silk fabrics, leather, boots and shoes, liquor, flour, tobacco goods, furniture, pianos, matches, glass, soap and other commodities. Trade interests are chiefly in the hands of French, German and English merchants. There are fifteen public markets and several highly-capitalized banks.

Health Conditions. Though the climate of Mexico City is moderate and healthful, the city long bore an unfavorable reputation as to health conditions. Its annual death rate was formerly forty to every 1,000 inhabitants. This was due to inadequate sewerage and drainage systems, a soil polluted by the refuse of several centuries, and unwholesome living conditions in the poorer districts. In 1900 the government completed a magnificent sewerage and drainage system, and the death rate has since then greatly decreased. Epidemic outbreaks among the ignorant and poorer classes, however, are still a source of danger.

History. About 1325 the Aztecs, looking for a place on which to build a city, saw an eagle on a cactus devouring a snake. Interpreting this as a favorable omen, they settled on the site of the present city and called the place

Tenochtitlan, meaning *caetus on a stone.* Later the name Mexico was chosen, as a mark of honor to their god of war, Mexitli. When the Spaniards reached the city, in 1519, it contained 50,000 buildings and was ten miles in circumference. The army of Cortez practically destroyed it, and it was rebuilt by native workmen under the direction of the conqueror. In 1600 it had about 15,000 inhabitants, in 1800 about 120,000, and in 1910 the population was 471,066.

Mexico City was the objective point of the American troops during the Mexican War of 1846-1848, and was captured by them in 1847 (see MEXICAN WAR; CHAPULTEPEC, BATTLE OF). During the revolutionary disturbances following the abdication of Porfirio Diaz (which see) the capital city played an all-important rôle, for the contending factions all sought to gain possession of it. It was occupied in turn by Carranza, Zapata and Villa, and was the headquarters of Carranza when, in June, 1916, he issued a note to the United States demanding the withdrawal of American troops from Mexican soil, which they had occupied in pursuit of bandits. For details, see the article MEXICO, subtitle *Government and History.*

Consult Enoch's *Mexico;* Percival's *Mexico City.*

MEYERBEER, *mi'er bayr,* GIACOMA (1791-1864), a German composer whose best opera, *Les Huguenots,* still enjoys the popular favor which was meted out to it upon its first performance in 1836. Meyerbeer, first known as JAKOB MEYER BEER, was born at Berlin, of a wealthy and talented Jewish family. At the age of seven he played in public one of Mozart's concertos, and had he followed his talent in this direction he would have ranked among the foremost pianists. But he was ambitious to become a famous composer, and the failure of his first two operas, *Jephthah's Vow* and *Abimelek,* did not dishearten him. He went to Italy to study vocal composition, and at Venice was so captivated by the style of Rossini that he produced a series of seven highly-successful Italian operas. A few years later he composed his first French opera, *Robert le Diable,* and his masterpiece, *Les Huguenots.*

After his appointment by the king of Prussia as his music director in Berlin, Meyerbeer composed his two other great works, *Le Prophete* and *L'Africaine (The Prophet* and *The African),* and the comic opera, *Dinorah.* Through his efforts Wagner, who was then languishing in poverty and exile, was able to obtain a hearing in Berlin, and with Jenny Lind as prima donna and Meyerbeer as conductor Wagner's *Rienzi* and *The Flying Dutchman* scored brilliantly.

Critics disagree as to the relative merits of Meyerbeer as a composer. Some maintain that he labored more zealously for theatrical effect than for artistic merit; however, it is generally agreed that, although he adopted widely different styles of composition, he mastered the best effects of the various schools and utilized them to brilliant advantage.

MEZZO-RILIEVO, *med'zo re lya vo,* a form of relief sculpture (see RELIEF) in which the figures project one-half their thickness from the background. The term means *semirelief.* Though the figures in mezzo-rilievo are rounded, no parts are separate from the surface upon which they are carved. This form of sculpture is higher than bas-relief (which see) and lower than high-relief (see ALTO-RILIEVO).

MEZZOTINT, *med'zo tint,* or *mez'o tint,* meaning *middle tint,* is a process of engraving on copper or steel, in imitation of painting in India ink, the lights and shadows being scraped and burnished out of a prepared dark ground. Mezzotint does not involve the labor entailed by line engraving, in which the lines are plowed into the copper. Because of the range of tone in mezzotint, it is admirably adapted to depicting the various textures in a portrait or the planes of a landscape, but it is not a suitable form of engraving where small detail is demanded. Lieutenant-General Ludvig von Siegen, in 1642, invented the mezzotint. Later he explained the process to Prince Rupert, who introduced it into England. It was brought into use in North America in 1830, and was long a favorite with early magazine publishers. See ENGRAVING; ETCHING.

MIAM'I, FLA., the county seat of Dade County, in the southeastern part of the state, is a noted winter resort and one of the principal shipping points on the Southern Atlantic coast. The city has developed since 1896, when the location was chosen as the southern terminus of the Florida East Coast Railway, a line later extended to Key West, 156 miles southwest, over the ocean. Miami is 366 miles south of Jacksonville, and is on Biscayne Bay, at the mouth of the Miami River, which is the outlet of one of the large canals draining the Everglades. Since the improvement of Miami harbor, the city has direct steamboat communication with Havana, Cuba; San Juan, Porto Rico, and Nassau, in the Bahama Islands.

Various steamship lines connect with Atlantic ports.

Miami is known as the "Magic City," because of its rapid growth. The population in 1910 was 5,471, but the city in 1916 claimed over 15,000. It has a number of handsome hotels, a Federal building erected in 1914 at a cost of $225,000, a courthouse, city hall and a Y. M. C. A. building. Here is the southern terminus of the Dixie Highway (which see), and in and about the city are Bay Boulevard, Royal Palm, Lawrence and Biscayne drives. Interesting features of the city are the two-and-a-half mile bridge across the bay, an alligator farm, a large paint factory, a moving-picture studio and the subtropical laboratory of the United States government.

The city ships quantities of fish and sponges taken from Biscayne Bay, and oranges, grapefruit, cocoanuts, pineapples, avocados and limes, and winter vegetables. The value of the annual fruit and vegetable crop of Dade and Palm Beach counties exceeds $3,500,000. Miami is the trading center of the Seminole Indians, who live in and near the Everglades, northwest of the city. J.S.

MICA, *mi'kah,* sometimes incorrectly called *isinglass,* is the mineral whose most common use is observed in the doors of stoves. Mica is easily recognized because of the glassy appearance of its crystals, and because they can be separated into very thin plates. It is found surrounded by other rocks. There are several varieties, but white mica, or *muscovite,* is the one most widely used. When taken from the mine it is freed from the other rock and then split into layers of the desired thickness. Some of these layers for the most delicate purposes are thinner than tissue paper. The plates are cut with shears into different sizes; all those of one size are wrapped in packages, usually of one pound each, for the market. The waste from making the plates is ground to a powder, which is used for lubricating machinery when oil cannot be applied, for absorbing nitroglycerine in making dynamite, and for producing the "frost" effect on wall paper. The plates are also used for insulators in dynamo-electric machines.

Black or dark-green mica is known as *biotite.* Mica is quarried in large quantities at Grafton, N. H.

MICA SCHIST, *shist,* the rock which imparts to the White Mountains the snow-capped appearance from which they take their name, but which is abundant in nearly all mountain regions. It is composed of mica and quartz and is usually formed in layers which are folded. The mica may be white or black. Its arrangement in layers allows the rock to be easily divided into slabs. The peculiar whiteness of the White Mountains is caused by the reflection of light from this rock. It is of no value as a building stone, but may be used in rough foundation walls.

MICHAEL, *mi'ka el* or *mi'kel,* SAINT, one of the seven spiritual beings called the *archangels,* referred to in the Bible. Michael appears as one of the four great angels with Gabriel. In *Revelation* XII, 9, he is represented as a military commander in the heavenly war against Satan. The feast of Saint Michael occurs on September 29 in the Roman Catholic Church, while the Greek Church dedicates November 9 to this festival. See MICHAELMAS.

MICHAELMAS, *mi'kel mas,* a Christian festival held in honor of Saint Michael, the Archangel, and All Angels, celebrated on September 29 by the Roman Catholic, the Anglican and some other churches. The yearly celebration appears to have arisen out of a local church dedication in honor of Saint Michael in Italy in the fifth century, and by the ninth century it had become a day of considerable importance. The Greek, Armenian and Coptic churches dedicate November 9 to the feast of Saint Michael and All Angels.

MICHELANGELO BUONARROTI, *mi kel an' je lo bwaw nahr raw'te* (1475-1564), one of the greatest figures in the world of art, the most celebrated artist of the High Renaissance (see RENAISSANCE). Not only was he supreme as a sculptor and painter, but he was a poet, architect and military engineer as well —and he put the stamp of genius upon everything he touched. He was happiest when working with his chisel, for he displayed greatest power in sculpture. However, he was frequently called away from revealing the wonderful art concealed in the rough blocks of stone "in their superfluous shell" to execute some other masterpiece with his brush.

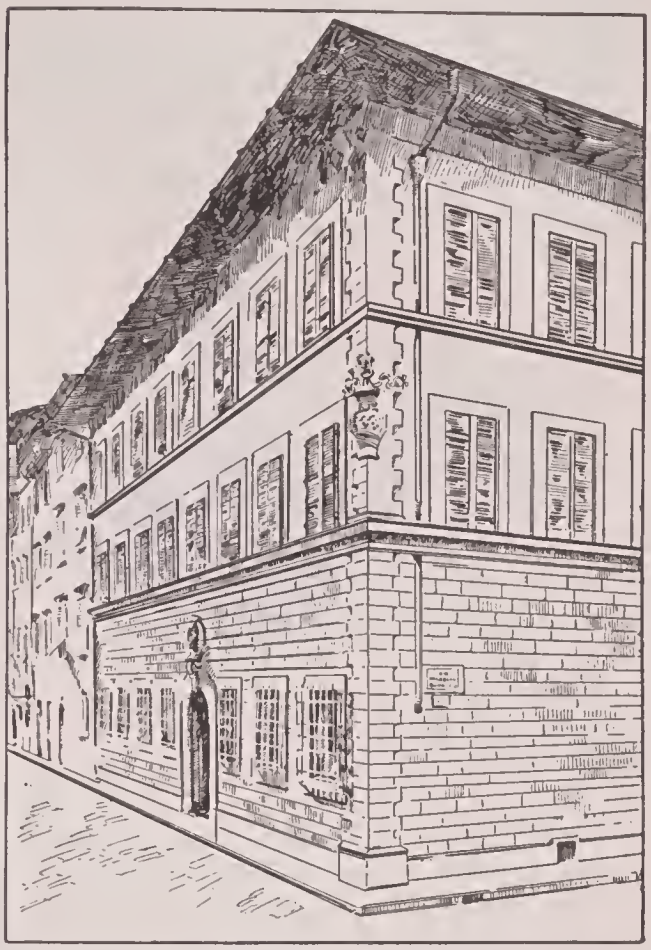
MICHELANGELO

A tablet in one of the rooms of a castle ruin at Caprese, in Tuscany, Italy, indicates that this mountain town was the birthplace of Michelangelo. He was a member of the ancient family of the Counts of Canossa, and studied drawing under Ghirlandajo and sculpture under Bertoldo, at Florence. Later Lorenzo de' Medici, the celebrated patron of art, became attracted to Michelangelo, and the young sculptor was permitted many privileges as a member of his household.

When twenty-four years of age he executed a wonderful statue of the dead Christ in the arms of His mother, the *Pieta* of Saint Peter's Church. Then followed *David,* a masterpiece in sculpture eighteen feet high and so heavy that it took forty men to roll it from the workshop to the great central square in Florence. There it remained until 1874, when it was transferred to the Academy, where it still stands in glory and majesty. To aid him in this work Michelangelo constructed a tower around the immense block of stone and worked inside, quite undisturbed.

His *Moses* is the chief surviving figure of a magnificent tomb which was to have been placed in Saint Peter's in honor of Pope Julius II. Had he been able to carry out his ideas this would have been the most stupendous monument of sculpture in the world. So enthusiastic was he over the plans that he spent eight months at the Carrara marble quarries selecting suitable blocks. For forty years this tomb occupied his thoughts, but because of the Pope's superstitious fears about its completion the work was retarded. Only the *Moses,* now in the little Church of San Pietro in Rome, and the *Bound Captives,* in the Louvre, represent the accomplishments of Michelangelo's dream; and in the fiery expression which he chiseled in the face of his *Moses* one can read his own keen disappointment. (See Moses, for illustration.)

However, Pope Julius II had another great assignment for him. This time it was to be a creation from his brush, the painting of the frescoes for the ceiling of his Sistine Chapel, in the Vatican. Michelangelo drew inspiration for these colossal paintings from Bible stories—the early stages of creation intermingled with historical scenes from the principal events in sacred history. In all there are 343 figures, of which more than 200 are important. Nothing in the history of painting excels the boldness and grandeur of this decoration in its entirety. Much of the painting had to be done while he was lying flat on his back on a staging of his own design. He was forced to look up so constantly that for many years after the ceiling was completed he could read only with his head thrown back. Michelangelo's next great work



HOME OF MICHELANGELO IN FLORENCE

was the execution of statues for the tombs of the Medici family in San Lorenzo, their Florentine church. The one known as *Il Penseroso,* from the pensive attitude of his subject, is counted among this genius's masterpieces.

When sixty years old Michelangelo was again summoned to Rome to paint the altar for the Sistine Chapel. This painting, *The Last Judgment,* his largest and most comprehensive canvas, is crowded with hundreds of figures; and although time has cracked the plaster and dimmed the coloring, it is still counted among the world's greatest paintings. Toward the end of his life he turned to architecture. He was appointed architect for the rebuilding of Saint Peter's; for this labor he would accept no pay, saying that he was doing all for the glory of God. He lived only to see the completion of the splendid gilded dome, but so faultless was his model for the building that his plans were perfectly carried out.

Michelangelo died at the age of eighty-nine, and was buried in the Church of Santa Croce

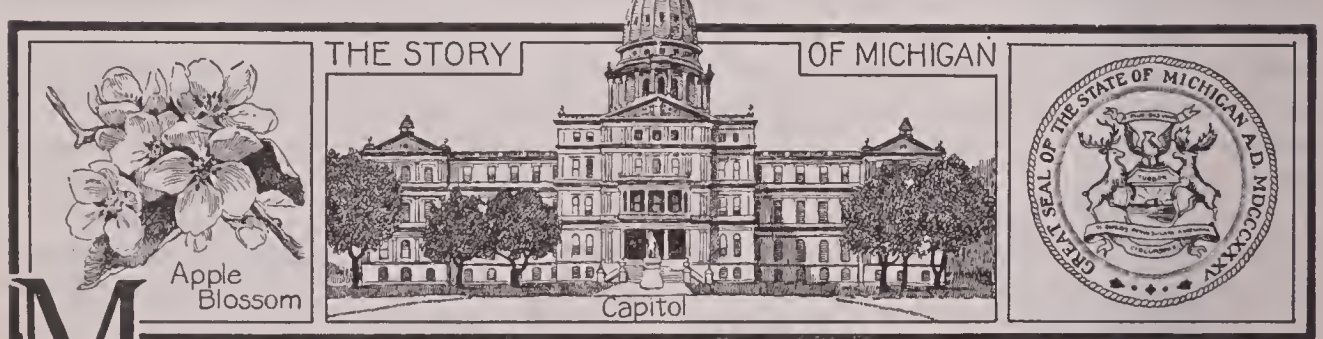
beside the scholars and statesmen of Italy's glorious days. The three figures on his tomb, representing sculpture, painting and architecture, disclose to posterity the story of his creative genius. R.D.M.

Consult Hurll's *Michelangelo;* Stearn's *Midsummer of Italian Art.*

MICHELET, *me shlay',* JULES (1798-1874), a French historian of the Romantic School. He was born in Paris and was the son of a master printer. At the age of twenty-three he was appointed professor of history in the Collège Rollin. While a lecturer in the Collège de France in 1838, he became involved in a bitter controversy over the unpopular order of the Jesuits, and in 1851 refused to take the oath of allegiance to Napoleon III. Through this act he lost his offices and incurred the enmity of the Church. He lived mainly in Brittany and on the Riviera, where he devoted himself wholly to literature. Michelet's style appealed to emotion rather than reason, and he was rarely a calm judge of events. In 1867 he finished the great work of his life, *The History of France,* in nineteen volumes. Other published works include *La Femme, Le Banquet,* and several volumes of natural philosophy.

JULES MICHELET

MICHELSON, *mi'kel son,* ALBERT ABRAHAM (1852-), an American physicist, born in Strelno, Germany, whose parents emigrated to the United States when he was a child. His reputation rests largely upon his series of investigations in the velocity of light, his measurements being characterized by a high degree of accuracy. The inferential refractometer, invented by him, made possible the measurement of linear distances in terms of the wave-length of light. He also devised a spectroscope which enabled him to secure a better dispersion of light than with the prism (see LIGHT). He was graduated at the Naval Academy, Annapolis, in 1873, and took graduate courses in physics in Berlin, Heidelberg, the College of France and the Polytechnic School, Paris. He was appointed professor of physics in the Case School of Applied Science, in Cleveland, Ohio, and later held the same position in Clark University. In 1892 he was appointed as the head of the physics department in the University of Chicago. For his discoveries in physics, he was awarded the Nobel prize in 1907. Among his notable publications is a work entitled *Light Waves and Their Uses.*



MICHIGAN, *mish'i gan,* one of the north-central states of the American Union, named after the lake which forms much of its western boundary. The word is of Indian origin and probably means *great lake* or *great water.*

Michigan is sometimes called the PENINSULAR STATE because it is divided by lakes Michigan and Huron into two peninsulas, the upper and the lower. It is popularly known as the WOLVERINE STATE, and as its flower it has chosen the apple blossom. With great natural agricultural resources; timber and mines; well-developed and varied industries; splendid educational system; advanced political institutions, and early humane legislation, as embodied in its laws for the protection of the labor of women and children, Michigan is one of the most interesting states in the Union.

Size and Location. The northern peninsula of the state seems much the smaller section, yet from east to west its extreme length is 500 miles. The state is so surrounded by lakes Michigan, Huron and Erie that no point in the state is more than eighty-five miles from the shore of one of them. Its coast line is about 1,600 miles, being greater than that of any other state. Florida and California rank next

to it, authorities differing as to which of these two has the longer.

Michigan is the largest state east of the Mississippi River except Georgia, and ranks twenty-second in size among the states of the Union. It covers about the same area as England and Wales together. It has an area of 57,980 square miles, of which 500 square miles are water; but this does not include the water area of the Great Lakes within the state boundaries. The distance in a straight line from Detroit in the southeastern part of the state to Isle Royale in Lake Superior is about the same as that from Detroit to New York. About 200 islands scattered in the Great Lakes are included in the state of Michigan; of these, Mackinac Island is one of the historic spots of the United States.

Its People. In population Michigan, with 2,801,173 inhabitants in 1910, ranked eighth among the states of the Union, coming between Missouri and Indiana. The estimated population January 1, 1917, was 3,074,560. It had in 1910 an average number of 48.9 persons to the square mile, and ranked seventeenth among the states in density of population. The southern half of the lower peninsula is the most thickly-populated section. Michigan has nearly 300,000 more inhabitants than the neighboring Canadian province of Ontario, which since 1912 has an area seven times as large. Of the total population in 1910, 43.6 per cent were whites of native parentage; 34.3 per cent were whites of foreign or mixed parentage; 21.2 per cent were foreign-born whites, and 0.6 per cent were negroes. Of the foreign-born white population, 28.7 per cent came from Canada; 22.1 per cent from Germany, 7.2 per cent from England, and about 5 per cent each from Russia, Holland, Austria and Sweden. The Canadian element is larger here than in any other state except Massachusetts.

During the decade from 1900 to 1910 there was a considerable increase in the proportion of the inhabitants living in towns. In 1910 the urban population constituted 47.2 per cent of the total population, as compared with 39.3 per cent in 1900. Over two-fifths of the urban population lived in the two cities of Detroit and Grand Rapids. There were 106 cities in the state in 1910; this unusual number is accounted for by the fact that no minimum population requirement is imposed upon villages which seek city charters; there is one city, Harrison, with only 600 inhabitants. Each of the most important cities is described elsewhere.

Religion. Half of the people of the state belong to the Roman Catholic Church, while nearly one-quarter belong in about equal numbers to the Methodist and the Lutheran churches. The rest of the population is divided

OUTLINE MAP OF MICHIGAN

Showing the boundaries of the state, the principal cities and rivers, mineral deposits, coal and gas areas and the highest point of land in the state.

largely among the Baptists, Presbyterians, Congregationalists and Protestant Episcopalians, in the order named.

Education. Michigan was a pioneer state in creating the American educational system, and has always been noted for the excellence of its public schools. It adopted a very good school organization at the time it was admitted to the Union, and this has been improved continuously by subsequent legislation. The state now possesses a good compulsory education law, with fairly effective means for its enforcement, voted in 1911. All children between the ages of seven and sixteen years are required to attend school the entire length of the school year. Special provision is made for the education of backward and feeble-minded children. The employment of children under fourteen years is prohibited, but children between fourteen and sixteen may be allowed to work if they have completed the eighth grade and have a permit from the school authorities. The public schools are maintained from the income derived from the state school lands, of which there are still large areas, also from the state funds and from local taxation.

The educational institutions are under the supervision of a state superintendent of public

instruction, elected for two years, who must be a graduate of a university, college or normal school, and who must have taught five years in Michigan. The schools of each county are under the direct charge of a county school commissioner, elected for four years; each school district has its local board of education.

At the head of the educational institutions stands the University of Michigan at Ann Arbor (see MICHIGAN, UNIVERSITY OF), opened in 1841, and it is one of the largest and best known universities in the Union. The state maintains the agricultural college at Lansing, opened in 1857, the first agricultural college founded in the United States; and the college of mines at Houghton, opened in 1886. Among other colleges are Detroit College at Detroit, Hope College at Holland, Albion College, Alma College, Hillsdale College, Kalamazoo College and Olivet College; these are maintained by various religious denominations.

For the training of teachers there are four state normal schools, namely, at Ypsilanti, opened in 1852, the first normal school established west of New York; at Mount Pleasant, opened in 1895; at Marquette, opened in 1899; at Kalamazoo, opened in 1903. A marked feature of the Michigan system for the training of teachers is the county training school, which was established in 1903. These schools have already trained over 6,000 teachers. Michigan was among the first states to adopt the movement for teachers' summer institutes; the first in this state was held as early as 1846.

In 1907 the law authorized the establishment of county schools of agriculture. One or several adjoining counties may vote to establish such a school, to which the state is obliged to grant financial support. These schools teach agriculture, domestic science and manual training. Since 1908 numerous juvenile corn-growing associations which have as their object the scientific cultivation of corn have been founded among the schoolboys. Since 1911 fraternities and school societies have been abolished in all public schools.

The percentage of illiteracy is low, being 3.3 per cent of the total population in 1910; but if the native white population alone is considered it is only 1 per cent.

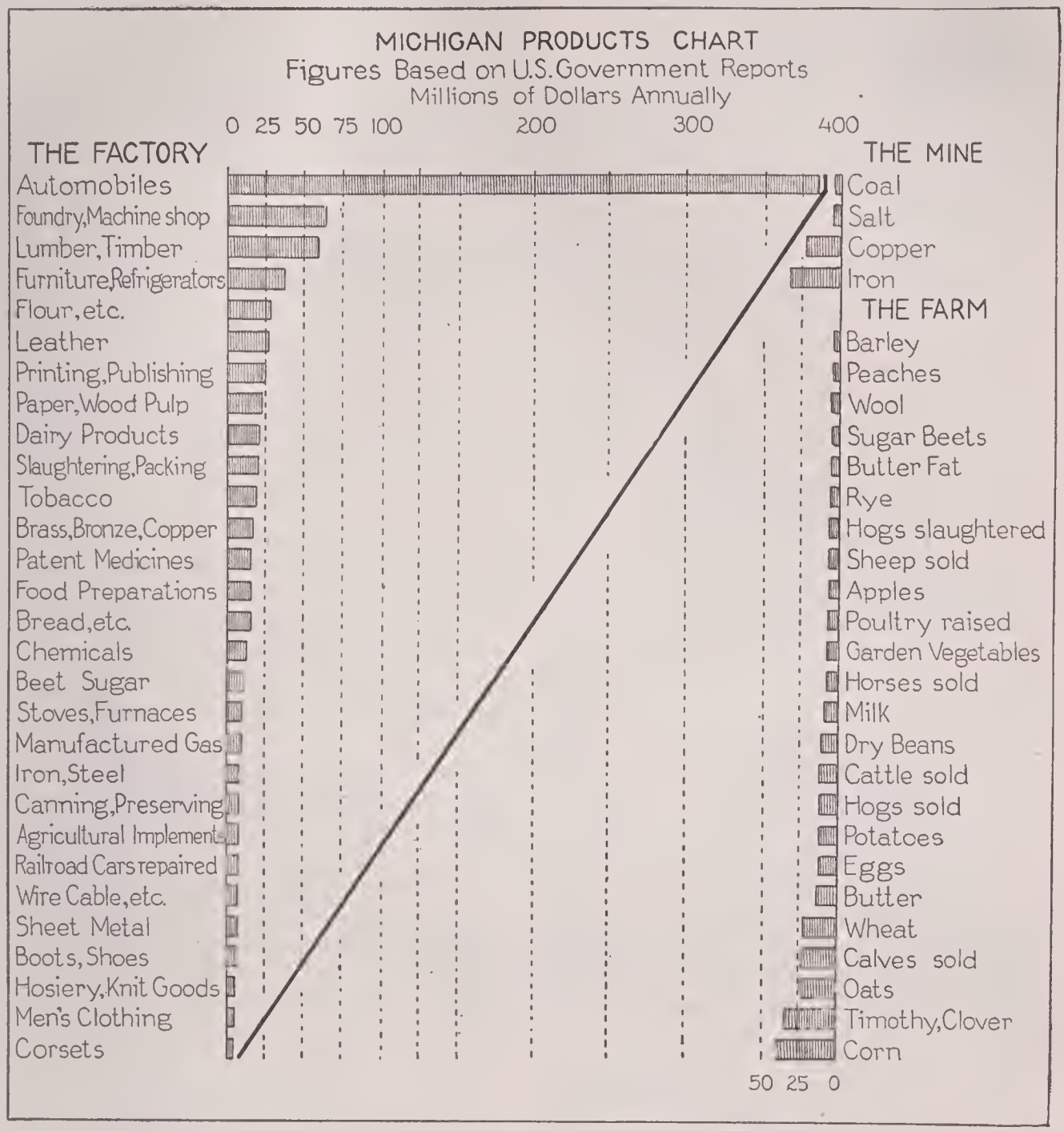
Physical Features. The upper peninsula has a rough, hilly or mountainous surface, and is a region of mining, lumbering, hunting and summer outings. The highest mountains in the state are the Porcupine Mountains, reaching an elevation of 2,000 to 2,100 feet above sea level, situated in the northwest, along the shores of Lake Superior. Parallel to the Porcupine Mountains is the famous Copper, or Mineral, Range. The lower peninsula is generally level and undulating, the highest land being around Saginaw Bay. The average altitude of this region is about 850 feet above sea level, or 270 feet above the level of lakes Michigan and Huron.

The lower peninsula is dotted with a large number of small, clear lakes, most of which are surrounded by forests and are noted for beauty and for an abundance of fish. It is estimated that there are more than 5,000 such lakes within the state; Oakland County alone has about 500. Along Lake Michigan there are numerous high bluffs and picturesque sand dunes.

Its Rivers. The rivers are short, small and shallow. The streams of the upper peninsula flow into Lake Superior, and many of them have beautiful waterfalls; these can be utilized for abundant water power. Among the chief streams are the Menominee, the Ontonagon, the Manistique, and the Escanaba, which flow into Lake Michigan. The largest streams of the lower peninsula are the Raisin and the Huron, flowing into Lake Erie; the Saginaw, the Au Sable, the Thunder Bay and the Cheboygan, flowing into Lake Huron; and the Grand, the Kalamazoo, the Saint Joseph, the Muskegon and the Manistee, flowing into Lake Michigan.

Climate. There is a marked difference between the climate of the lower peninsula and that of the upper peninsula, the mean annual temperature being 48° F. for the southern and 39° F. for the northern counties. The summers are cool and the winters are severe, usually with heavy snowfall. The presence of the lakes gives the lower peninsula milder winters and cooler summers than are experienced elsewhere in the same latitude. That portion of the state bordering on Lake Michigan, and extending as far north as Grand Traverse Bay, is influenced by the southwestern winds which prevail throughout the year. These winds tend to lengthen the cold season, and thus retard the early budding of fruit trees, prevent the appearance of late frosts and also prolong the warm season into the fall. Such conditions are especially favorable to the growing of fruit, and this region constitutes what is widely known as the Michigan fruit belt. The average rainfall in the state is about thirty inches, quite evenly distributed throughout the year.

Agriculture. Agriculture is the chief occupation of the people of Michigan and consti-



tutes the chief source of wealth of the state. Over one-half of its total land area, approximating 36,787,000 acres, was included in farms in 1910; and over two-thirds of this was improved land. The total value of farm property including land, buildings, implements and machinery, and live stock was $1,088,858,379, showing an increase in value of 57.7 per cent since 1900. The average size of a farm was 91.5 acres, and the average value of land was $32.48 per acre, as reported by the Federal census. One-third of the total farm acreage in the state was in farms of 100 to 174 acres, and a little under one-third was in farms between fifty and ninety-nine acres. Nearly eighty-five per cent of the farms were operated by owners or their managers, and only fifteen per cent by tenants. Seven out of every ten Michigan farmers are native whites, and nearly all the remainder are foreign-born whites; of the latter nearly two-fifths were born in Canada and over one-quarter in Germany.

The soil and climate make possible a variety of products. The leading crops are hay, corn, oats, wheat, rye, potatoes, sugar beets and market vegetables. The largest acreage is under hay and forage plants, but the crop of the greatest value is corn. Michigan ranks second in the production of potatoes, coming after New York. Michigan grows more potatoes than Illinois, Indiana and Ohio combined, its yearly output averaging forty-one million bush-

els. The state ranks second in the production of rye, coming after Wisconsin; it ranks third in the production of buckwheat, following New York and Pennsylvania. On the drained swamp lands along the shores of lakes and rivers are many acres suitable for growing onions, cabbage, celery and other vegetables. Sugar beets is one of the leading crops; Michigan is third in beet production, coming after Colorado and California. The area under sugar beets is over 102,000 acres, and the product amounts to about 900,000 tons a year. Michigan raises nearly seventy per cent of the total production of beans in the United States, its output being nearly five million bushels. It also leads in the production of peas, with over 1,100,000 bushels a year, as well as in that of celery, chicory and peppermint. The state produces the bulk of the peppermint crop of the United States, in a small district in the southwest corner of the state; the largest peppermint farm in the world is in Allegan County.

As regards its climate and its soil, no state except California seems to be more favorably suited for the raising of fruit. The southwest corner of the state is generally known as the fruit belt, and here large quantities of apples, pears, peaches, plums and grapes are raised. Michigan is now the third state in the Union in apple growing, being surpassed only by New York and Pennsylvania; its yearly output is over seventeen and one-half million bushels. Over one and one-half million bushels of peaches and nearly one million bushels of pears are grown yearly. In small fruits, strawberries, blackberries and raspberries, Michigan ranks second among the states.

Forests. The region now included in the state was formerly covered with dense forests. The upper peninsula and the northern part of the lower peninsula are to-day quite heavily timbered, although lumbering operations have for years been on a very extensive scale. These primeval forests have long been among the most important sources of the wealth and prosperity of the state. In past years the cutting of the forests was done in a very wasteful way, but now scientific methods of forestry are followed, and there is a state commission for the better protection of the forests. It is estimated that nearly two-thirds of the total area of the state is still woodland. White pine was formerly the most abundant variety, but a great portion of the forests containing this timber has been cut. Hemlock forms now the greatest proportion of the softwood cut; other varieties are spruce, cedar and balsam fir. Maple, beech, birch, elm, and ash are the chief hardwoods. In 1914 the state ranked first in the cut of maple and beech. From 1870 to 1900 Michigan was the leading lumber state in the Union; it still ranks third, being surpassed only by Washington and Louisiana. The abundance of timber has been of great importance in developing other industries for which timber serves as raw material.

Fisheries. In the value of its fishing products Michigan ranks first among the Great Lakes states. Herring forms nearly one-third of the catch, while trout, whitefish and various pike perches are in the order named the other more important kinds of fish. It is estimated that the catch amounts to over fifty million pounds a year.

Live Stock. The raising of live stock and the dairying industry are growing steadily in importance. The value of live stock was nearly $185,000,000 on July 1, 1916. At that time there were in the state 814,000 milch cows, and 707,000 other cattle; 673,000 horses, 4,000 mules, 1,392,000 swine and 2,033,000 sheep. In the production of milk, butter, cheese and eggs the state ranks high. In the number of sheep and the clip of wool, which amounts to over 8,100,000 pounds of raw wool and over 4,050,000 pounds of scoured wool yearly, Michigan is only surpassed by Ohio among the states east of the Mississippi.

Minerals. Michigan ranks sixth among the states of the Union as regards the value of its mineral products, which averages over $72,000,000 a year. The great bulk of this wealth is furnished by copper and iron. Here are situated some of the most famous and the richest copper mines in the world—the Calumet and Hecla. Until 1887 it was the leading state in the production of copper, and even to-day it furnishes nearly one-quarter of the total output of the United States. With an average yearly production of over 230,000,000 pounds, Michigan now ranks third, following Arizona and Montana. The state has furnished nearly thirty per cent of the total output of copper in the United States since 1845. The copper mines are situated almost exclusively in the northwestern corner of the upper peninsula, known as the Keweenaw Peninsula, on the shores of Lake Superior.

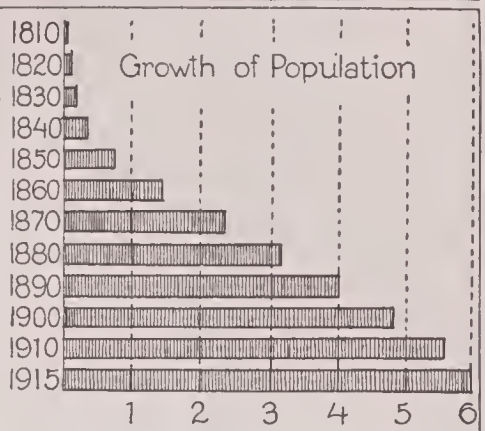
The same region also contains very rich iron deposits; in fact, the Lake Superior region, extending in Michigan, Minnesota and Wisconsin, is the greatest iron ore region in the

MICHIGAN

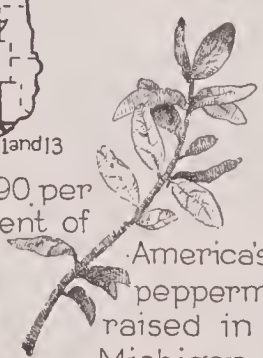
THE SAND DUNES

Congressional Districts

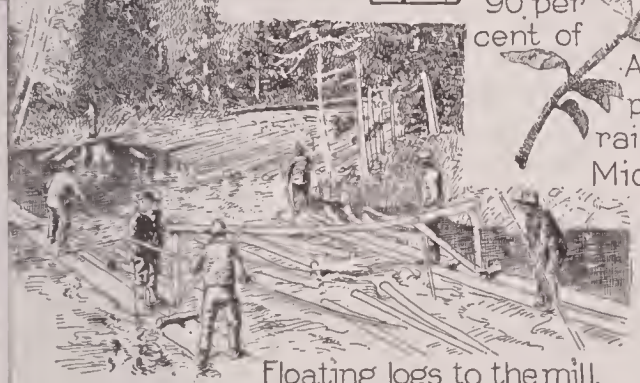
Religions



Figures represent half-millions



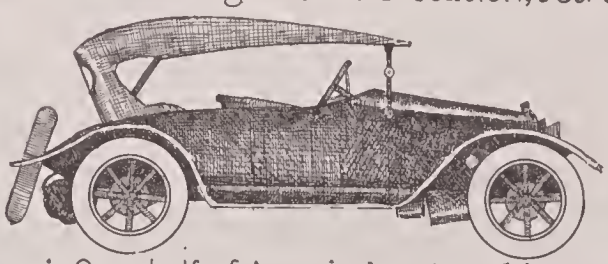
90 per cent of America's peppermint raised in Michigan



Floating logs to the mill.

Michigan Central Station, Detroit.

The Wolverine



Over half of America's automobiles are made in Michigan.

University Hall ~ University of Michigan

world. Iron ores were first discovered at Ishpeming in 1844; the Marquette district, on the shores of Lake Superior, was opened in 1877; in 1882 mining began further south, in the Menominee district, and in 1884 in Gogebic County. Until the beginning of the twentieth century Michigan was the leading state in the Union in the production of iron ores, but since then it has been surpassed by Minnesota. The state produces about thirteen million tons of iron ore a year, which constitutes nearly one-third of the total output of the United States.

In the production of salt, Michigan ranks second, running New York very close for first place; it produces one-third of the total salt output of the United States. Large deposits of gypsum are found near Grand Rapids. The state ranks third in the production of alabaster, large deposits of this mineral being found near Tawas City. Numerous deposits of rock and marl beds, from which Portland cement is manufactured, are found throughout the state. Excellent clay for the manufacture of brick and tile and also suitable for pottery is found in many localities. During recent years coal has been mined, mostly around Saginaw and Bay City; the yearly output averages about 1,300,000 tons.

Mineral springs of generally accepted medicinal value are found in several parts of the state. The most famous are those at Mount Clemens; those at Benton Harbor and Alma are increasing in importance.

Manufactures. Michigan comes immediately after the six great manufacturing states in the Union, namely, New York, Pennsylvania, Illinois, Massachusetts, Ohio and New Jersey. It owes its manufacturing position to its situation on four of the Great Lakes and to its great agricultural, timber and mineral resources. The value of its manufactured products had risen to nearly $700,000,000 in 1915. One of the chief characteristics of industry in Michigan is that it is very much diversified, that is, it includes the manufacture of a great number of articles. No state manufactures a greater variety of objects or commodities more essential to modern civilization or comfort.

The most important single industry, as measured by the value of its products, is the automobile industry. The manufacture of automobiles in this state has shown a wonderful growth. Woodward Avenue in Detroit is fast becoming the greatest street in the world for the show and display of automobiles. Michigan manufactures more automobiles than any other state; its output in 1916 amounted to over half of the total value of the automobile industry in the United States. In the same year Michigan produced fifty-five per cent of the automobiles made in the United States, and a very large proportion of these were made in Detroit. Lansing and Flint are important centers of the industry, also. The next most important branch of industry is represented by lumber and timber products. These include the manufacture of furniture, in which Michigan ranks second, being slightly below New York. Grand Rapids is noted as one of the most important furniture centers of the world.

The state occupies a leading position in the manufacture of cereal and breakfast food preparations, which are produced chiefly at Battle Creek, and in the value of its output of stoves and furnaces, refrigerators, adding machines and druggists' preparations. Other important branches of industry are founding and the making of agricultural implements, flour and grist mill products, chemicals, cement, vehicles other than automobiles, such as carriages, wagons, railway and street cars; the manufacture of cigars and tobacco, slaughtering and meat packing, and tanning and the manufacture of leather. This last industry is favored by the great quantities of tanning bark found in the state.

Michigan ranks third in the production of beet sugar, coming after California and Colorado; its production averages nearly 115,000 tons of sugar a year. Shipbuilding is attaining large proportions, and is carried on mostly at Detroit, Port Huron and Wyandotte. Large quantities of paper- and wood-pulp products are manufactured here, the chief center of the industry being Kalamazoo. It is worth mentioning that nearly all the air guns with which the boys throughout the United States play are manufactured in Michigan.

Transportation. Situated between four of the Great Lakes, the state has excellent water transportation facilities, and many good harbors are found on its extensive coast line. The state is also well provided with railroads, for it is crossed by several trunk lines that connect the Eastern states with the Middle West, and which join with Canadian lines at Detroit and Port Huron. There were 8,933 miles of railroad in 1914. The chief lines are the Michigan Central; the Lake Shore & Michigan Southern; the Wabash; the Grand Trunk System of Canada; the Pere Marquette; the Chicago & North Western; the Chicago, Milwaukee &

RESEARCH QUESTIONS ON MICHIGAN

(An Outline suitable for Michigan will be found with the article "State.")

What is the popular name for the state? What does this name mean?

About what is the difference in length between the coast line of Michigan and that of the states which rank next to it? What is the difference in character?

How can you tell whether the territory of Michigan was named for the lake, or the lake for the territory?

How many of the states have a greater area than Michigan? How many of these larger states lie to the east of this state?

How many states have a larger population? Are these more populous states all larger?

Is this state more or less densely populated than the United States as a whole? Than its neighbor states to the south and west?

Why has Michigan more cities than other states which have perhaps a greater population?

How does the state rank with reference to its interest in education?

In what way is the school system designed to benefit the farmers?

Are the greatest elevations in the state in the northern or the southern peninsula? How do the two peninsulas differ in surface character?

If the lakes of Michigan could be distributed among all the states, about how many would each have?

How great a difference is there between the average annual temperature for the lower peninsula and that for the upper?

Why is the region along Lake Michigan especially suited to fruit growing?

Of the total area of the state, about how large a percentage is actually improved farm land?

Name three products in which Michigan leads all the states; two in which it ranks second; three in which it ranks third.

About how large a proportion of the area of the state is under forests? What has been done to prevent deforestation?

How many states border on the Great Lakes? How many of these catch more fish in a year than does Michigan?

What two famous mines has this state? What is taken from them? How does the state rank in the output of this product?

Is there any other metal in which it ranks higher?

What mineral product of Michigan appears on your table at every meal?

How many states have a larger yearly value of manufactured articles? What is one of the chief characteristics of the manufacturing industries in Michigan?

What remarkable preëminence did Michigan's greatest city have in 1910 in the automobile-manufacturing industry?

What article that nearly every boy in the country asks for at Christmas time comes from Michigan?

What do you think of when the name of Grand Rapids is mentioned? Battle Creek?

What very important public utilities besides railroads does the state railroad commission have under its charge?

How many years has the state been governed under its present constitution? How many had it had previously?

Saint Paul; the Minneapolis, Saint Paul & Sault Sainte Marie; the Duluth, South Shore & Atlantic; the Detroit & Mackinac; the Ann Arbor, and the Grand Rapids & Indiana. There is also a well-developed and extensive network of interurban electric lines. During recent years the state has started to improve its highways.

Michigan possesses a railroad commission, appointed by the governor, which has extensive powers. Since 1915 the express companies and the telephone lines have been classed as common carriers and have been put under its control.

Government. Michigan is governed under a new constitution adopted in 1908. This is the third the state has had since its admission to the Union in 1837. Amendments may be proposed in either branch of the legislature, and are adopted if they receive two-thirds of the vote in each house and are afterwards approved by a majority vote of the people. Since 1913 amendments may also be proposed by petition of not less than ten per cent of the qualified electors, filed with the secretary of state at least four months before election.

The executive officers, the governor, lieutenant-governor, secretary of state, treasurer, auditor-general, attorney-general and superintendent of public instruction, are each elected for two years. Among the offices created recently is that of state fire marshal, who receives his appointment from the governor.

The legislative power is vested in a senate, consisting of thirty-two members, and a house of representatives, consisting of not fewer than sixty-four and not more than 100 members. The members of both houses of the legislature are elected for two years and by single districts. Sessions are held every second year, beginning on the first Wednesday in January of odd-numbered years, and are not limited as to length. Michigan sends thirteen members to the United States house of representatives.

At the head of the judicial department is the supreme court, consisting of eight judges, elected for eight years. The members of the court are required to reside at the state capital, and the justice whose term expires first is chief justice during his last year of service. The state is divided into judicial districts and each has a circuit court, presided over by a judge elected for six years. Each county has a probate court, whose judge is elected for four years.

Towns and cities may adopt the commission form of government. The electors of cities and villages have power to make or amend their charters. Cities and villages may acquire, own and operate their public utilities.

Other Constitutional Provisions. Michigan has adopted a county local option law for dealing with the liquor traffic, and over one-fourth of the state is prohibition territory. Drinking of alcoholic liquors in trains, except in dining cars, is prohibited. Breweries may not own saloons, directly or indirectly. An employers' liability law, which does not apply to farm laborers and domestic servants, was adopted in 1912. Married women have a right to their personal earnings. Girls under eighteen are not allowed to work in a factory; children under sixteen are not allowed to work in a factory, workshop, mine or in messenger service between the hours of 6 P. M. and 6 A. M. The working hours of children under eighteen are limited to ten a day and fifty-four a week. An amendment to the constitution, adopted in 1913, provides that statute laws may be enacted by the initiative and referendum (which see). There is a primary election law for direct nomination of all elective state, county and municipal officers. In 1913 the state adopted the recall (which see) of all elective public officers except judges of the courts. In 1920 women in Michigan will for the first time cast their votes for electors of the President of the United States.

Charitable and Penal Institutions. The state maintains a school for the blind at Lansing; an employment institution for the blind at Saginaw; a school for the deaf at Flint; a school for feeble-minded and defective children at Lapeer, and a school for poor and dependent children at Coldwater, which was the first institution of its kind in the United States. The state prisons are at Jackson and Marquette; there is a house of correction at Detroit. The state reformatory for young men offenders is at Ionia; an industrial school for boys (reformatory) is at Lansing, and one for girls is at Adrian. The state maintains at Howell a sanatorium and farm colony for the care and treatment of epileptics. Hospitals for the insane are at Pontiac, Kalamazoo, Traverse City, Newberry and Ionia. As regards its penal legislation Michigan has adopted a probation law as well as a parole law and the indeterminate sentence.

History. *The Earliest Settlements.* French Jesuit missionaries and traders had visited Michigan as early as 1610, but the first permanent settlement was founded at Sault Sainte

Marie by Father Marquette in 1668. Numerous villages were soon established, and Detroit was founded in 1701 by Cadillac. The territory made little progress under French occupation, and in 1763, at the close of the French and Indian War, it passed to the English by the Treaty of Paris. The Indians, loyal to the French, rose under Pontiac, massacred the garrison at Mackinac Island, then besieged Detroit for over five months, but without success. In 1774 the territory was annexed to Quebec, but by the Treaty of Paris in 1783, which closed the Revolutionary War, it passed to the United States. Thereafter for several years the Indians were restless, until they were finally subdued by General Wayne in 1795.

Made a Separate Territory. Michigan was made a part of the Northwest Territory, then for a time was a part of the territory of Ohio and of Indiana, but was made a separate territory in June, 1805, with William Hull as governor. It was the scene of important operations during the War of 1812. A dispute with Ohio concerning a strip of land along the southern boundary led to what was known as the "Toledo War" and delayed its admission as a state. Finally, on January 26, 1837, it was admitted as the twenty-sixth state of the Union.

Its Progress as a State. For a number of years the state was the victim of a spirit of speculation, which retarded its growth. The capital was removed from Detroit to Lansing in 1847. A new constitution was adopted in 1850, which remained in force until 1908. During the War of Secession Michigan contributed about 93,000 men to the Union armies. Since that time the chief issues in state politics have been the taxation and regulation of corporations. Many counties have been prohibition territory for years, but the voters in 1916 decreed that the entire state should be "dry" after 1918, in advance of the national prohibition amendment. After unsuccessful attempts, the state gave full suffrage to women, beginning with the elections of 1919. O.B.

Consult Dilla's *The Politics of Michigan;* Cook's *Michigan, Its History and Government;* Skinner's *The Story of Michigan.*

Related Subjects. Much additional information will be found by the reader interested in Michigan in the following articles:

CITIES

Adrian
Alpena
Ann Arbor
Battle Creek
Bay City
Benton Harbor
Cadillac
Detroit
Escanaba
Flint
Grand Rapids
Hancock
Holland
Iron Mountain
Ironwood
Ishpeming
Jackson
Kalamazoo
Lansing
Laurium
Ludington
Manistee
Marquette
Menominee
Muskegon
Negaunee
Owosso
Pontiac
Port Huron
Saginaw
Sault Sainte Marie
Traverse City
Wyandotte
Ypsilanti

HISTORY

Cadillac, Antoine de la Mothe
Jesuits
Marquette, Jacques
Northwest Territory
Pontiac
Raisin River, Massacre of
War of 1812

LAKES

Great Lakes, The

LEADING PRODUCTS

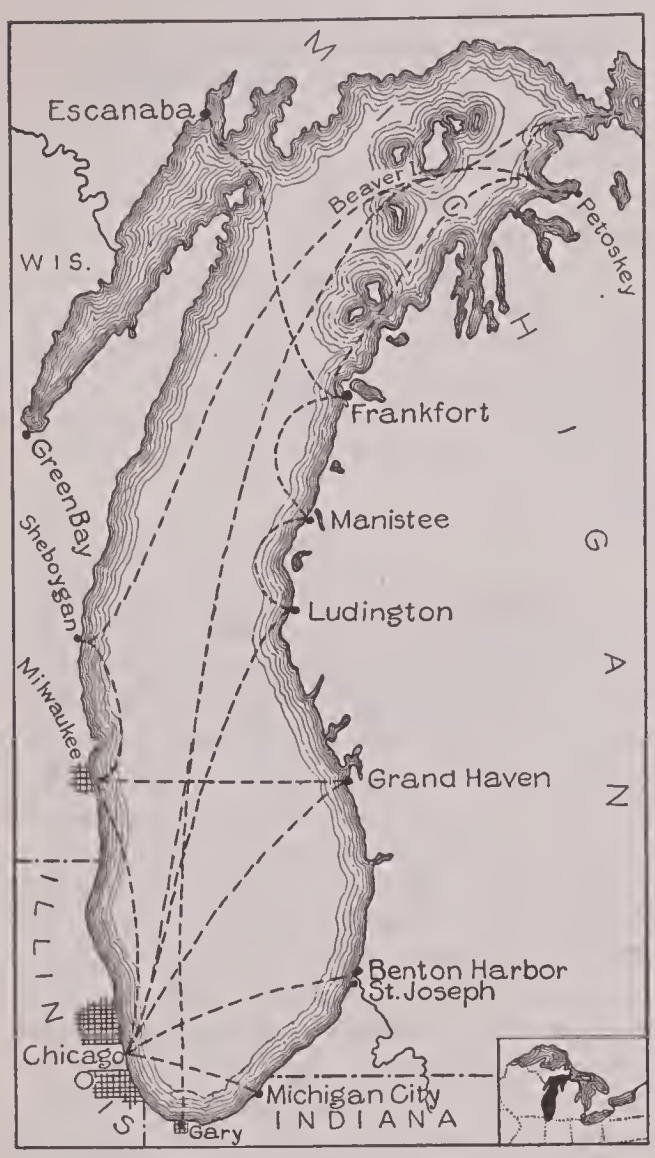
Apple
Automobile
Bean
Breakfast Foods
Buckwheat
Copper
Corn
Fish
Furniture
Hay
Iron
Lumber
Pea
Peppermint
Potato
Rye
Salt
Sugar

MICHIGAN, Lake, the third in size of the five Great Lakes of North America, and the largest body of fresh water lying entirely within the boundaries of the United States. It washes the shores of the state of Michigan on the east, of Indiana on the south, of Illinois and Wisconsin on the west and of Upper Michigan on the west and north. From north to south it has a length of about 300 miles. The average width is seventy-five miles, the average depth is 870 feet and the area is 22,450 square miles. Lake Michigan therefore covers almost the same space as New Hampshire, Massachusetts and Connecticut combined. Its surface is 581 feet above sea level, the same elevation as that of Lake Huron, and it is twenty-one feet below the surface of Lake Superior, eight feet above that of Lake Erie and 334 feet above that of Lake Ontario.

It receives the waters of the Saint Joseph, Kalamazoo, Grand, Menominee and other rivers, and discharges into Lake Huron through the Strait of Mackinac; hence it is a most important factor in that great waterway of Eastern North America which affords transportation to the Atlantic Ocean for the extensive products of the grain, lumber and mineral regions. It is also the outlet for large rail shipments to the South by way of Chicago, the fourth largest city in the world, on its southwestern shore.

The Chicago Drainage Canal and the Illinois and Michigan Canal connect the lake with the Mississippi River. Navigation is suspended in the northern part of the lake for about four months of the year, owing to ice in the Strait of Mackinac, but during the warmer months transportation is heavy.

Many steamers ply on its waters between various resorts of the United States and Canada. Among the important towns and cities on its



LAKE MICHIGAN
Its cities and steamer routes.

shores are Petoskey, Manistee, Traverse City, Ludington, Muskegon, Grand Haven, Benton Harbor and Saint Joseph in Michigan; Michigan City and Gary in Indiana; Chicago, Evanston and Waukegan in Illinois; and Milwaukee, Sheboygan, Manitowoc and Marinette in Wisconsin. Its waters abound in fish, especially trout and whitefish. Green Bay is the largest indentation on the western coast, and Grand Traverse Bay and Little Traverse Bay are the largest on the eastern coast. The surface of the lake is varied in the north by many islands, the largest being Washington Island and Beaver Island. See GREAT LAKES, THE. J.S.C.

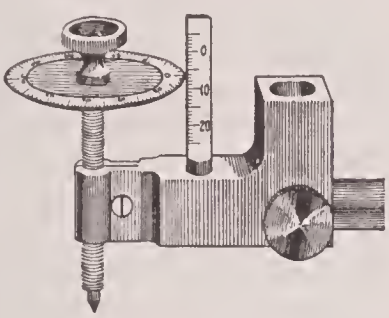
MICHIGAN, UNIVERSITY OF, one of the largest and most important of the American state universities and the first of these to assume and maintain a position of prominence. It was established by the legislature in 1837, at Ann Arbor, and began its formal sessions in 1841. The university maintains a college of literature, science and the arts, a college of engineering and architecture, schools of law and medicine, a college of pharmacy, a homeopathic medical school, a college of dental surgery and a graduate school. Courses have recently been established in forestry, in marine engineering, in highway and construction engineering, in aeronautics, in wireless telegraphy and in public health. The graduate school has been maintained separately from the other departments since 1912. Each of the university divisions has its particular faculty, and each is represented in the university senate, where questions of common interest are discussed.

The University of Michigan was one of the first American institutions to adopt coeducation, women having been admitted since the year 1870. Since 1871, when Dr. James B. Angell became its president, its development has been remarkable. It is equipped with libraries containing a total of about 350,000 volumes, and with valuable museums of art, science and history. It maintains an astronomical observatory. Two general hospitals, in addition to the state hospital for those who are mentally diseased, are operated in connection with the university. In debating, oratory, athletics and scholarship, Michigan takes high rank among American universities. Its faculty numbers about 460 and the student enrolment is 7,214. H.B.H.

MICHIGAN CITY, IND., an important shipping point and the oldest lake port of the state. It is situated in Laporte County and on Lake Michigan, near the northern state line, thirty-eight miles southeast of Chicago by water and fifty-six miles by rail. It is on the Pere Marquette, the Lake Erie & Western, the Chicago, Indianapolis & Louisville and Michigan Central railways; during the summer months excursion boats make daily trips to and from Chicago. Interurban lines connect with cities in the northern part of the state as far east as Elkhart and west to Chicago. The first permanent settlement was made in 1833, and the city was incorporated in 1837. In 1910 the population was 19,027; in 1916 it was 21,512 (Federal estimate). The area is six and one-fourth square miles.

The growth of the commercial and industrial interests of Michigan City is due to its shipping facilities. Iron ore, salt, lumber and farm products are the chief articles of trade, and the manufacturing interests are represented by lumber mills and furniture, chair, hosiery and knitgoods factories. All of the railroads serving the city have big machine shops here. Michigan City has a United States life-saving station, the Northern Indiana state prison, a public library, a soldiers' monument and a large amusement park on the lake front. Of special interest to visitors are the great sand dunes which have been heaped upon the lake shore west of the city.

MICROMETER, *mi krom' e ter,* an instrument used in connection with a microscope or telescope for measuring very small distances. The name is derived from the Greek word *mikros,* meaning *small,* and *metron,* meaning *measure.* The simplest form of micrometer consists of a fine scale marked on a glass disk in hundredths of an inch to form squares; the observer is enabled to determine the size of the object by the number of squares covered. Surveyors' instruments have micrometers attached which measure distances by means of a screw with a very fine thread, and there are also special forms for the accurate measurement of V-threads on bolts and screws. Another special form is used to measure star distances on photographic plates.

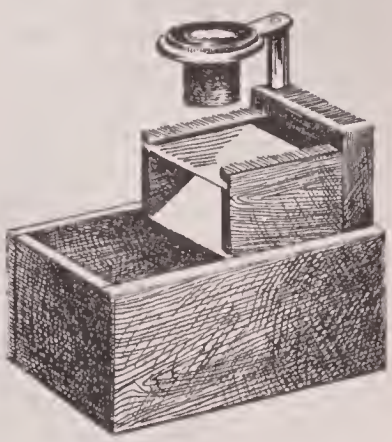


MICROMETER
Used by surveyors.

MICRONESIA, *mi kro ne' shi a,* a name applied to a division of Pacific islands lying between the Philippines on the west and the 180th meridian. The group is one of the four divisions of Oceania. For location and names of the islands of Micronesia see colored map accompanying the article OCEANIA.

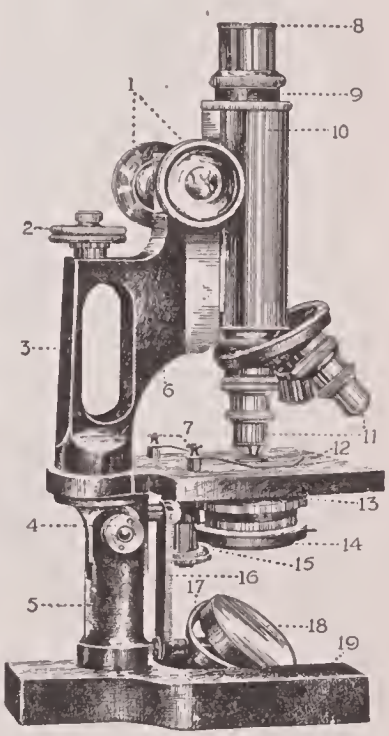
MICROSCOPE, *mi' kro skope,* from two Greek words, *mikros,* meaning *small,* and *skopein,* meaning *to view,* is the name applied to an instrument for magnifying small objects.

Simple Microscope. This is commonly called a *magnifying glass;* it consists of a stationary double-convex lens to be held between the object and the eye. It is very useful for examining flowers, insects, etc., and is a familiar object in the high school biological laboratory. The most powerful simple magnifiers have a magnifying power of twenty diameters; that is, they are capable of making the surface of an object examined appear 400 times larger than it really is. The average microscope, however, has a power of from five to ten diameters. The simple microscope has been in use for centuries. In the ruins of Nineveh was found a lens of rock crystal that had been used as a magnifier by the ancient Assyrians thousands of years ago.



A SIMPLE MICROSCOPE
With glass slide for objects.

Compound Microscope. This instrument has for its essential parts an object glass and an eyepiece. These are mounted in tubes so adjusted that the tube containing the eyepiece slides within the one which holds the object glass. The tubes are attached to a stand, the latter containing a platform for holding the object. Beneath the platform is a small convex mirror for reflecting light upon the object. A magnified image of the object is formed by the object glass, and a magnified image of this image is formed by the eyepiece. The apparent size of the object is increased or reduced in proportion as the



COMPOUND MICROSCOPE
(1) Coarse adjustment by rack and pinion
(2) Micrometer head of fine adjustment
(3) Fine adjustment pillar
(4) Inclination point
(5) Pillar
(6) Arm
(7) Clips
(8) Eyepiece
(9) Draw tube
(10) Body tube
(11) Object glasses
(12) Platform
(13) Upper iris diaphragm
(14) Lower iris diaphragm
(15) Focusing screw
(16) Mirror bar
(17) Mirror fork
(18) Mirror
(19) Horseshoe base

lenses are farther apart or nearer together; thus the observer may increase the magnifying power of the instrument by extending the tube. Most compound microscopes have three object glasses and one eyepiece. A microscope having two tubes to be used with both eyes is called a *binocular*. For the various parts of a compound microscope see the accompanying illustration. The first instrument of this kind was made in 1590 by a Hollander named Zacharias Janssen; every generation has witnessed important improvements.

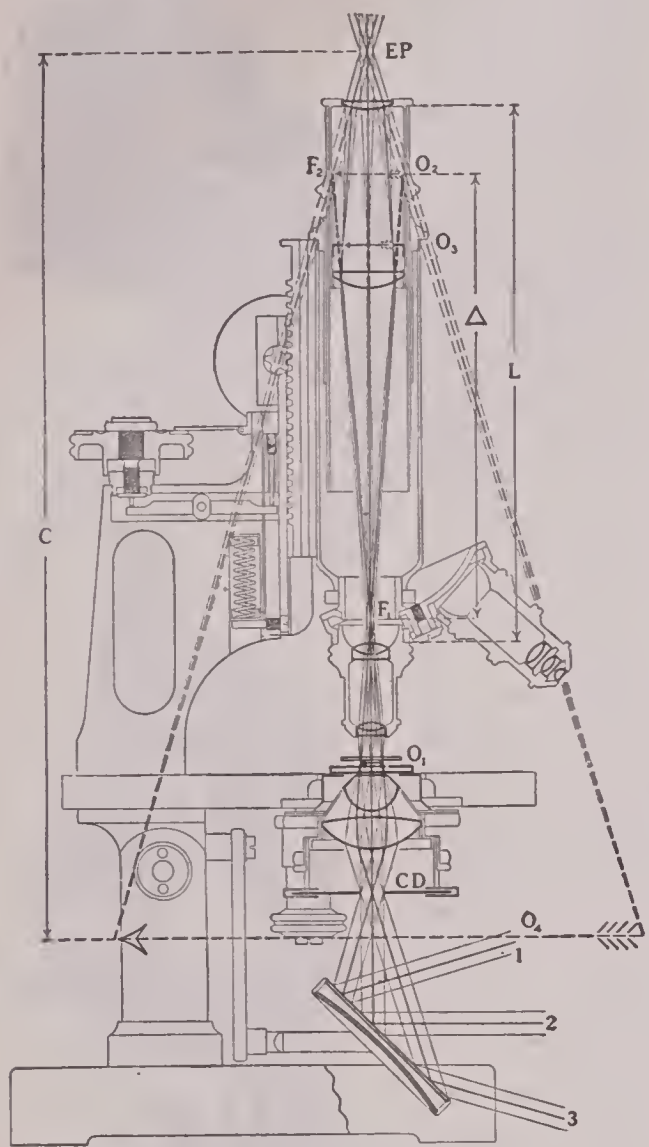


DIAGRAM SHOWING PATH OF LIGHT RAYS

F_1 Upper focal plane of objective
F_2 Lower focal plane of eyepiece
Δ Optical tube length = distance between F_1 and F_2
O_1 Object
O_2 Real image in F_2, transposed by the collective lens, to
O_3 Real image in eyepiece diaphragm
O_4 Virtual image formed at the projection distance C, 250 mm. from
EP Eyepoint
CD Condenser diaphragm
L Mechanical tube length (160 mm.)
1, 2, 3 Three pencils of parallel light coming from different points of a distant illuminant, for instance, a white cloud, which illuminate three different points of the object

Most objects can be easily seen under the microscope, but those which cannot need special treatment and are placed upon a glass mounting prepared for the purpose and covered with a thin glass which is cemented in place with Canada balsam. Specimens containing disease germs and those in which minute cell structures are to be shown must be spread on glass, dried, passed through a blue flame and stained with coal-tar or aniline dyes, as *fuchsine* or *methylene blue,* or with gentian violet.

Some Results of Microscopy. Many marvels of insect and plant life and hidden secrets of the mineral kingdom have been revealed to the scientist by means of the microscope; but more than this, the perfection of the instrument has revolutionized the science of medicine. A drop of blood may now be examined and so magnified that the physician can tell whether or not it contains any of those minute forms of animal life that mean disease. Bacteriology, the study of bacteria, could not have been pursued if man had never had a knowledge of the compound microscope, and the various disease germs, those that are responsible for malaria, typhoid fever, diphtheria, etc., could not have been detected. The microscope has, therefore, been a wonderful agent in destroying the power of disease and in making the world a more healthful place in which to live. C.R.M.

Consult Clark's *Practical Method in Microscopy;* Carpenter's *The Microscope.*

MIDAS, *mi'dahs,* a mythical king of Phrygia who had a wondrous garden into which Silenus loved to go. The king, by mixing some poison in a fountain, succeeded in capturing the old satyr, whom, after a time, he returned to Bacchus. Pleased at regaining his old tutor, Bacchus conferred upon Midas the power of turning to gold everything he touched. When this power proved a curse, by turning his food to gold, the king besought release from Bacchus and was told that if he bathed in the river Pactolus he would be freed.

Once Midas acted as judge between Apollo and Pan in a musical contest, and decided in favor of the latter. This so enraged Apollo that he caused a pair of ass's ears to grow upon the king's head. Midas tried to conceal the deformity, but a slave discovered it when dressing the ruler's hair. Afraid to tell, yet unable to keep the strange secret, the slave dug a hole in the earth and there whispered his funny tale. Later, reeds grew up over the spot, and whenever the wind blew over them they sang to all passers-by, "King Midas has ass's ears."

MIDDLE AGES, a name given to the period between ancient and modern civilization. Many different dates are given for both the beginning and the end of this period. Some authorities assert that the Middle Ages began with the fall of Rome in A. D. 476; others that it began with the crowning of Charlemagne in 800, with the death of Charlemagne in 814, or with the fall of the Frankish Empire in 843. Most authorities agree on the fall of Rome in 476, and divide the time into the *Dark Ages,* when learning and civilization were temporarily obscured, and there was scarcely any progress, and the *Renaissance,* or *rebirth,* of knowledge, of arts and of industry.

There is almost as great divergence of opinion as to the close of the Middle Ages as there is as to the beginning. The end of the Reformation in Germany, the fall of Constantinople (1453), the discovery of America (1492), and the end of the Thirty Years' War by the Treaty of Westphalia (1648) are all advanced as the final boundaries, but the event most generally accepted as the date of transition is the discovery of America in 1492. See DARK AGES; RENAISSANCE.

MIDDLESBROUGH, *mid'd'lz bruh,* an English seaport near the mouth of the River Tees, in Yorkshire. It was founded in 1830 and grew slowly until 1852, when iron ore was found in the Eston Hills; thereafter the population increased at a remarkable rate. The town is well built, and has many public buildings of real architectural beauty, including a town hall and library, a Roman Catholic cathedral and a museum. Aside from its iron-manufacturing industries, the town is also noted for shipbuilding. There are large docks, a two-and-a-half mile breakwater and an excellent harbor. The tonnage of incoming and outgoing vessels per year is about 3,250,000, and the district produces annually over two million tons of pig iron. Population, 1911, 104,760.

MID'DLETON, SIR FREDERICK DOBSON (1825-1898), a British soldier, best remembered for his services in suppressing the Saskatchewan, or Riel, Rebellion in Canada in 1885. Sir Frederick was born at Belfast, Ireland. At the early age of seventeen he was graduated from the Royal Military College at Sandhurst, and thereafter was in active service in Australia, New Zealand and India. During the Indian Mutiny of 1857 and 1858 the Victoria Cross was given him for valor. From 1868 to 1870 he was in Canada with his regiment, and in 1884 returned to the Dominion as commander-in-chief of the militia. When the Saskatchewan Rebellion broke out General Middleton at once took charge of operations and himself commanded the right, which advanced from Qu'Appelle to Batoche and defeated the rebels in the Battle of Fish Creek. As his reward General Middleton received a grant of $20,000 from the Dominion Parliament and the honor of knighthood from Queen Victoria. He remained in Canada until 1890, when he returned to England. In 1896 he was appointed keeper of the crown jewels.

MIDDLETOWN, CONN., a county seat of Middlesex County, situated in the southwestern part of the state and on the west bank of the Connecticut River. Hartford, the state capital, is fourteen miles north. Transportation is provided by the New York, New Haven & Hartford Railway and by the river, which to this point is navigable for smaller vessels. Interurban lines radiate from the city in all directions. In 1910 the population was 11,851; in 1916 it was 13,273 (Federal estimate).

The region around Middletown is a rich agricultural country, especially adapted to the growth of tobacco. Through its water power and shipping facilities the city has become a manufacturing center of importance. Among the varied articles produced are pumps, marine hardware, woolen blankets, hammocks, rubber, bone, silk goods, electrical appliances and silver-plated ware. Valuable sandstone is quarried in Portland, a city on the opposite bank of the river, connected with Middletown by a long drawbridge. The municipal building, Middlesex Hospital and the Russell Free Library, containing 15,000 volumes, are the noteworthy buildings, and one mile southeast are the imposing buildings of the state hospital for the insane. Middletown has Wesleyan University, with a library of 60,000 volumes; Berkeley Divinity School (Protestant Episcopal), opened in 1854, and the state industrial school for girls.

Middletown was founded in 1650 and is one of the oldest cities in the state. In 1651 it was incorporated as the town of Mattabeseck, the present name being adopted in 1653; in 1784 it became a city.

MIDDLETOWN, N. Y., is a city in Orange County, in the southeastern part of the state, sixty-seven miles northwest of New York City. It is on the Erie, the New York, Ontario & Western and the Middletown & Unionville railroads, and has an interurban line to Goshen. The area of the city is four square miles. The population in 1910 was 15,313; in 1916 it was

15,810 (Federal estimate). Middletown is well situated in a fertile agricultural country and contains several attractive parks, a Federal building, the State Homeopathic Hospital for the Insane, a state armory, city hall, Masonic Temple, Thrall Library and Thrall Hospital. In the town and vicinity are many summer residences. The city has shops of the New York, Ontario & Western Railroad, and manufactories of condensed milk, cheese, leather, saws, files, straw hats, shirts, candy, cut glass and printers' supplies. There was a settlement at Middletown in 1706. The name refers to its position halfway between the Hudson and Delaware rivers, on the old Minisink road to the western part of the state. It was incorporated as a village in 1848 and became a city in 1888. L.S.C.

MIDDLETOWN, Ohio, a city in Butler County, in the southwestern part of the state, thirty-four miles north of Cincinnati. It is on the Miami River and the Miami & Erie Canal and on the Cincinnati, Hamilton & Dayton, the Cincinnati Northern, the Cincinnati, Lebanon & Northern (a branch of the Pennsylvania lines), and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. There is an electric interurban line from Cincinnati through Middletown to Dayton, twenty-two miles north. The population, which in 1910 was 13,152, was 15,625 in 1916 (Federal estimate). The area is two and a half square miles.

Wheat, dairy products and tobacco from the fertile Miami Valley are marketed in Middletown, and here are large manufactures of agricultural implements, paper, tobacco, steel, steel sheets, iron, motorcycles, paper machinery and gas engines. The city has a Federal building, Carnegie Library and public hospital. Middletown, which received its name from its central position between Cincinnati and Dayton, was settled in 1794 and incorporated in 1833. The commission form of government was adopted in 1913. The waterworks are owned by the municipality.

MIDLAND, a town in Simcoe County, Ontario, on an arm of Georgian Bay called Hogs Bay. It is on the Grand Trunk Railway, 102 miles north of Toronto by the shortest route, 116 miles northwest of Peterborough and thirty-three miles northwest of Orillia. Steamers connect Midland with Parry Sound and other ports on Georgian Bay. Population in 1911, 4,663.

Midland is an important manufacturing center. Its largest establishments are lumber and planing mills and sash-and-door factories, but a shell factory, woolen mill, flour mill, engine works and blast furnace are worthy of mention. Midland also has a shipbuilding yard, and has considerable trade in coal and grain. Hydroelectric power is obtained from the Severn River.

MIDSUMMER NIGHT'S DREAM, a comedy by Shakespeare, played in 1595 and published five years later. Suggestions of various parts of the plot are to be found in old sources, but the general plan was largely original with the author. Fairies, monsters, peasants, nobles, mingle in the action, which at no time is to be taken seriously. Though probably intended as a pageant, this play is much more fitted to be read than to be acted, for the imaginative charm is difficult of presentation on the stage. The "Pyramus and Thisbe" interlude is one of the most humorous things in all of Shakespeare's works. (See Drama, page 1855, for suggestions for dramatization and for illustrations.)

All brilliant flowers are pale and dead
And sadly droop to earth,
While pansies chill in velvet robes
Count life but little worth;
But in these dark November days
That wander wild and wet,
Our thoughts are winged to summer hours
On breath of mignonette.
—Pierson: *Mignonette.*

MIGNONETTE, *min yun et',* a widely cultivated garden favorite with modestly colored flowers of delicate, pleasing fragrance. It is a plentiful weed in Africa and Asia Minor, whence

it was carried to Europe and America. The name was given it in France and means *little darling*. From a low, bushy mass of smooth, soft green leaves, the mignonette sends inconspicuous spikes of bloom. The tiny flowers of green and white fringe, brightened only by reddish anthers within, would attract no attention were it not for their delightful fragrance. Through cultivation many improvements have been made in the size and color of the flower spikes.

The mignonette thrives best in a cool temperature and a rather light soil. It is hardy, and a succession of seed plantings will furnish a continuous supply of blooms. Seeds sown in July will insure flowers in November, a fact dwelt upon by Eliza O. Pierson in her poem, *Mignonette*.

MIGRA'TION OF ANIMALS. See ANIMAL, subtitle *Migration of Animals*.

MIGRATION OF BIRDS. See BIRD, subtitle *Migration of Birds*.

MIKADO, *mi kah'doh,* a word meaning *exalted gate,* is the official title of the emperor of Japan. It is heard more outside of Japan, however, than in that country, where he is preferably called *Tenshi-Sama,* "Son of Heaven," *Mikado* being reserved for poetry. The imperial line dates back to 660 B.C. and descent is claimed from the gods, that created all things. The mikadoship is therefore the longest continued office in existence. The person of the mikado is held in the most sacred veneration, for he is regarded by the Japanese as the foundation of all wisdom and the center of their history and government. Each mikado has a title by which he is known to history after death. Yoshihito, who ascended the throne in 1912, is the 133rd of the line of mikados, seven of whom were women. This unique title is more familiarly known throughout the west than almost any other title, through *The Mikado,* the popular light opera of Gilbert and Sullivan, which is a travesty on the office.

MILAN, *mil'an,* or *mil an',* in Italian MILANO, *me lahn'o,* set in the midst of fertile Lombardy in one of the most picturesque parts of Italy, is the second largest of Italian cities, being surpassed in size only by Naples. For centuries a great commercial center, it has become the chief financial and banking city in Northern Italy. Milan is surrounded on three sides by walls, and is entered by fourteen gates, some of them of great magnificence. It has suffered too much from the ravages of war to give the visitor an impression of its antiquity, for from the havoc wrought a busy, enterprising city has sprung up. Its royal and archiepiscopal palaces are of regal splendor. On the walls of the refectory of the church of Santa Maria delle Grazie, built in 1462, is Leonardo da Vinci's *Last Supper*. Of still greater fame is the magnificent Gothic cathedral, one of the largest churches in the world (see below).

The principal secular building is the Brera Palace, formerly a Jesuit college, now the palace of fine arts and sciences, containing paintings by Raphael, Luini, Bellini, Titian and many other masters. The Ambrosian Library contains 164,000 volumes and 8,100 manuscripts, in addition to a fine collection of drawings and pictures. Milan possesses a famous Conservatory of Music, and its opera house is the second largest in Italy. The city carries on a prosperous trade in grain, cheese, butter, eggs and poultry, and has varied and important manufactures, including silk, machinery, automobiles, furniture and glassware. It is, in addition, the center of the Italian book trade.

Milan's authentic history began about 222 B.C., when it was wrested from the Gauls by the Romans. In the twelfth century it was the strongest of the city republics, and two centuries later was made a duchy for the family of Visconti, who gradually became supreme over almost all of Lombardy. On the extinction of the Sforza dynasty, Charles V united Milan with Spain. In the early eighteenth century it was ceded to Austria, and later was made the capital of the Napoleonic kingdom of Italy. In 1815 it was restored to Austria and continued to be the capital of the Austro-Italian kingdom until the annexation of Lombardy to Piedmont in 1859, when it became a part of United Italy (see ITALY, subtitle *History*). Population of city and suburbs, 1911, 599,200.

Milan Cathedral, a world-famous Gothic masterpiece, is situated in the chief open square in the center of the life of the city, and ranks next to Saint Peter's at Rome and the cathedral at Seville, Spain, so is the third largest and finest church in Europe. Its foundation was laid by Gian Galeazzo Visconti in 1386; and it was completed by order of Napoleon I in 1805-1813. A canal was built solely for the purpose of conveying marble from the quarries of Ticina for its construction. The Milanese were determined to make it their building of buildings, and during the centuries some of the greatest architects of Europe helped to perfect their ideals. The cathedral is built of white Carrara marble, in the form of a cross, with a length of

486 feet and a breadth of 287 feet. The tower, from which a beautiful view of the distant Alps and the picturesque environs is obtained, is 356 feet high. The exterior is adorned with about 6,000 statues in niches, and there are hundreds of turrets and pinnacles. The windows present wonderful stories pictured in stained glass. Some of the great men who have contributed to Milan's greatness are buried in the cathedral, and there in 1805 Napoleon, amid great pomp, was crowned king of Italy. R.D.M.

Consult Noyes' *Story of Milan;* Ady's *History of Milan.*

MILAN DECREE, *de kree',* an important document issued by Napoleon Bonaparte in 1807 during his struggle for supremacy in Europe. Realizing that his desire to invade England was impracticable, he planned the financial ruin of the country by shutting off its trade with the continent of Europe. England had already closed all seaports from the Elbe River to the end of the French coast, and in 1806 Napoleon retaliated by issuing the Berlin Decree, blockading the British Isles and making all English ships subject to seizure. This he followed, in 1807, by the Milan Decree, declaring that a ship of any nationality which had touched at British ports would be regarded a hostile vessel and a prize of war, if captured. But English warships still controlled the ocean. English vessel men demanded large sums for running the French blockade, and trade was nearly destroyed. Accordingly the Continent was impoverished, other powers were antagonized, and Russia, in 1810, diplomatically abandoned its policy of coöperating with Napoleon. With his fall, in 1814-1815, the Continental System (which see) came to an end.

MILDEW, *mil'du,* a name applied to a variety of plant disorders and also to the molds and rusts that collect on food, clothing, furniture, etc. There are two classes of plant mildew, the *powdery* and the *downy.* Powdery mildews, which usually form flourlike blotches of white on the surface of the host, attack flowers, fruits, stems and leaves of various plants by means of tiny sucking organs, stunting the growth of the diseased portion or killing it. This form of mildew can often be checked if the plants are dusted with dry sulphur, or exposed to fumes of boiling sulphur. Downy mildews develop within the plant, appearing on the surface when they shed their summer spores, and producing the familiar downy, whitish appearance. Since this disease develops within the plant it cannot be combated so easily as the powdery mildew, and consequently causes serious damage to vegetation. Spraying with Bordeaux mixture is, however, a helpful remedy. The mildews on furniture, clothing, walls, etc., represent other species. See Rusts; Mold; Insecticides and Fungicides.

MILE, a unit of distance which originated with the Romans, and which has been adopted, with slightly varying values, by Western countries. England's statute mile, used in Great Britain and the United States and their possessions, is 320 rods or 5,280 feet long. The square mile in these countries contains 640 acres. The geographical, or nautical, mile is one-sixtieth of a degree of latitude, or about 6,080 feet. The knot, by which the rate of a vessel's motion is measured, is equivalent to one nautical mile. Below is a table comparing the miles of other countries with the English mile:

English Statute Mile	1.000
English Geographical Mile	1.150
French Kilometer	0.621
German Geographical Mile	4.610
Russian Verst	0.663
Austrian Mile	4.714
Dutch Ure	3.458
Norwegian Mile	7.021
Swedish Mile	6.644
Danish Mile	4.682
Swiss Stunde	2.987

MILES, Nelson Appleton (1839-), an American soldier who distinguished himself in many of the most important battles of the War of Secession and later as an Indian fighter on the frontier of what was then the West. He was born in Westminster, Mass., and was early in life a clerk in a mercantile house in Boston, but at the outbreak of the war in 1861 he entered the service of the Twenty-second Massachusetts regiment. In 1862 he was promoted to the rank of colonel and passed rapidly through all the grades, being brevetted brigadier-general in 1864. After the war he joined the regular army and during the next fifteen years was known for his aggressive campaigns against hostile Indians in the West. In 1886 he captured the troublesome Geronimo, chief

NELSON A. MILES
America's most distinguished general of the past generation.

of the Apaches, and in 1890 settled the Dakota Indian troubles. He succeeded to the command of the regular army in 1895, and during the war with Spain, in 1898, conducted the campaign in Porto Rico with ability. On August 8, 1903, having reached the age limit, he was retired from active service. His published works include *Personal Recollections, Military Europe, Serving the Republic* and *Observations Abroad.*

MILES CITY, MONT., the county seat of Custer County, on the Chicago, Milwaukee & Saint Paul and the Northern Pacific railroads. Billings is 114 miles southwest, by rail. The city is growing rapidly, and is becoming known as a market for range horses, and many saddles are made here. Sheep are raised near the city, and many are shipped from this point. There is a fine park bordering the Tongue River, and an Ursuline convent and a state industrial school. Population, 1915, estimated, 7,621.

MILETUS, *mi le' tus,* an ancient city of Ionia, Asia Minor, at the mouth of the Maeander River, once famous as a trading center and for its manufactures of woolen goods. Boats and camel trains exchanged their cargoes at its wharves. It was the birthplace of important Greek thinkers and writers and the home of a great school of philosophy. Paul visited Miletus shortly before his imprisonment at Rome. The ancient city was destroyed by the Persians in 494 B.C. but was rebuilt. Near the site of the old city, which has been excavated by German archaeologists, is the small Turkish village of Palatia.

MIL'FORD, MASS., a city in Worcester County, thirty-two miles southwest of Boston and eighteen miles southeast of Worcester. It is on the Charles River and on the New York, New Haven & Hartford and the Boston & Albany railroads. The population in 1910 was 13,055; in 1916 it was 14,110 (Federal estimate). The area exceeds thirteen square miles. Milford is noted for its granite quarries, from which stone is shipped to every part of the United States, and for manufactures of looms for cotton machinery, foundry and machine-shop products, bone cutters, rubber and straw goods and shoes. The city has a Federal building, constructed of Milford granite, a public library, a hospital and several parks. A settlement was made here in 1669; the place was a part of Mendon until incorporated as a separate town in 1780. W.L.C.

MIL'ITARY ACAD'EMY, UNITED STATES, a national institution established by Congress at West Point, N. Y., in 1802, for the purpose of educating officers for service in the United States army. Earl Kitchener, the War Minister of Great Britain during the great European war from 1914 to June, 1916, and the most experienced British commander, after a visit to West Point in 1913 expressed the wish that the military schools and colleges of England could be modeled absolutely on the plan adopted at West Point, which he described as the finest military school in the world. Apart from the efficiency of the training given, West Point differs greatly from the military colleges of England in that it is possible for candidates to graduate without expense to themselves or families, while the English colleges are open only to sons of wealthy or well-to-do parents. Each accepted nominee to West Point is paid $600 per year by the government and a daily ration fee of thirty cents, which makes his total income $709.50 per year; he is able and is expected properly to maintain his position on that sum, and is prohibited from receiving money from home or from friends.

ARMS OF THE ACADEMY

The present era of the history of West Point began in 1817, under the direction of Major Sylvanus Thayer of the Corps of Engineers, when an adequate body of teachers was authorized, age and mental requisites for admission prescribed and the maximum number of candidates or cadets was fixed at 250. Under later acts that number has been greatly increased.

Number of Cadets. Each Congressional district and territory, including Porto Rico, is entitled to two cadets at the Academy. The District of Columbia is entitled to four. Each state is also apportioned four cadets from the state at large, and eighty are admitted from the United States at large, twenty of whom shall have been recommended as honor graduates of educational institutions having officers of the regular army detailed as professors of military science and tactics, and which institutions are designated as "honor schools" as a result of an annual inspection by the War Department. The President is also authorized to appoint cadets to West Point from among enlisted men of the regular army and National Guard, provided that the total number shall

not exceed 180 at any one time. The appointment from each Congressional district is made upon the recommendation of the United States Representative from that district, and the two from the state at large are named by the Senators from that state. The eighty appointments from the United States at large are controlled by the President personally. The cadets from the District of Columbia are nominated by the commissioners of the District and the two from Porto Rico by the governor of that territory. The Philippine Islands send four cadets, appointed by the governor-general. Appointments are made one year in advance of vacancies, and each appointment is made from the district in which the vacancy occurs.

The appointments at the command of the President of the United States are usually distributed among the sons of officers of the United States army, who, from the nature of their fathers' services and changing residences, are unable to obtain nominations from members of Congress. Nominees must be between the ages of seventeen and twenty-two, fit physically for military service, and be able to pass careful examinations in English grammar, composition, literature, algebra, geometry, geography (especially the United States), United States history and general history.

Course of Instruction. The course of instruction extends over a period of four years and is principally mathematical and professional and very thorough, necessitating the acquirement of a broad and comprehensive education. Mathematics, English, French, Spanish, drawing, drill regulations of all arms of the service, natural and experimental philosophy, chemistry, mineralogy, engineering, art and science of war, ordnance and gunnery are the chief subjects taught. That the examinations are severe is proved by the fact that only one-half of those admitted as cadets succeed in passing the final examinations.

Rules and Regulations. The discipline of the Academy is strict, even more severe than that of the army, and punishments, by loss of marks, are inflicted for breach of regulations. This course is inflexibly adhered to in order to impress upon the cadets the value of implicit obedience and punctuality. During his course of four years a cadet has to be present at about 18,000 roll calls, about fifteen each day, for classroom work, drills, etc. If late, a mark against him is the result, and if a cadet receives 215 demerit marks in any twelve months for all offenses combined, he is discharged. A high standard of honor and truthfulness is inculcated and maintained among the cadets, and the services rendered to the country by graduates of West Point are a striking tribute to the rules and regulations. During his entire course a cadet is allowed only one leave of absence, at the completion of two years at the Academy.

Examinations are held in December and June, and according to the results of these, cadets are promoted in their classes or discharged. On completion of the course and passing a final examination cadets are commissioned in the regular army with rank of second lieutenant. The superintendent is an army officer who has associated with him about eighty instructors, also army officers. The instructors in military science and tactics are changed every four years, being detailed by the Secretary of War.

From 1802 to 1913, inclusive, the Academy graduated into the United States army 5,205 cadets, and owing to the excellence of the training received, the United States has army officers equal in military, mental and social accomplishments to those of any country in the world. Cadets of the United States Military Academy wear a uniform of gray, the service coat being a sack coat without buttons, trimmed with black braid, the dress coat being a swallow-tailed coat with brass buttons. Rank or standing of cadets is indicated by chevrons or bars on the sleeve.

The Academy is beautifully situated, overlooking the Hudson River a few miles north of New York. In 1903 Congress appropriated $5,500,000 for new buildings and for remodeling the old structures, thus giving the institution an equipment among the finest in the world.

Service to the Nation. Nearly every military commander the country has produced since the organization of the Academy was educated there. There are a few notable exceptions, such as William Henry Harrison, Zachary Taylor, Andrew Jackson and Winfield Scott. The great leaders of the North and South, both on the side of the Federal government and of the Confederate States, were graduates of West Point. Notable among these are Grant, Lee, "Stonewall" Jackson, Early, McClellan, Beauregard and Sherman.

Of the soldiers whose reputations have been made since the War of Secession, there are few who did not receive their education at West Point. Possibly the most notable exceptions are General Chaffee, who rose from the rank of private to become lieutenant-general of the army; Nelson A. Miles, who rose to the same

exalted rank; Leonard Wood, who entered military life in 1886 as assistant-surgeon in the United States army, and whose ability raised him to the rank of major-general in 1903, and later to the post of chief-of-staff; and Frederick Funston, who entered the Cuban insurgent army in 1896 as captain of artillery, and who attained the rank of major-general in the United States army in 1914. L.R.G.

For description of the school which trains for the navy, see NAVAL ACADEMY, UNITED STATES.

Consult Holden's *West Point and the United States Military Academy;* Hancock's *Life at West Point.*

MILITARY PREPAREDNESS is the practical application of the old adage "In time of peace prepare for war." Every nation maintains a standing army, and any nation that has a seacoast maintains a navy. But military preparedness means more than maintaining an army and a navy, as the War of the Nations fully demonstrated. In the words of General Leonard A. Wood, chief-of-staff of the United States army, preparedness means:

> The organization of all the resources of the nation—men, material, money—so that the full power of the nation may be promptly applied and continued at maximum strength for a considerable period of time.
>
> Back of the machine itself is the railroad service so organized as to be turned over immediately to the military authorities. Back of this come the civil hospitals, the batteries and the supply departments of all sorts, each with its responsibility fixed in case of operations within its area, or in case of a demand for supplies in other sections of the theater of war. The plans of every ship are known, and plans completed for her use as a troop ship, and when war threatens, the whereabouts of the shipping is closely watched, and ships are assembled quietly to meet any demand which may be required for oversea operations.

Military Systems. Two systems of providing a standing army have been maintained for a long time; they are the *volunteer* system and the *compulsory* system or *conscription.*

The Volunteer System. Countries in which the volunteer system has existed have a strong objection to maintaining a large standing army in times of peace. Great Britain and her colonies and the United States are the leading countries that have relied upon the volunteer system. In both these countries the size of the army is fixed by legislative enactment, by Parliament in Great Britain and by Congress in the United States.

Under the volunteer system men join the army of their own free will and enlist for a definite term. When the time for which they enrolled has expired the men are discharged or are given the privilege of reënlisting. Every applicant undergoes a rigid physical examination, and only those who come up to the required standard are accepted. In the United States the term of enlistment was fixed by the army law of 1916 at seven years, three years with the colors and four years in the reserve. In Great Britain the term of enlistment in the regulars is twelve years, seven years with the colors and five in the reserve. These requirements apply in the time of peace. The emergency created by the War of the Nations caused them to be set aside. Canada maintains no regular standing army, but for service in the War of the Nations nearly 500,000 volunteers joined the colors.

FIRST DEFENSE AGAINST A FOE

The navy of the United States is the first line of defense against a foe from overseas. The above map indicates by the shaded areas the steaming radius of the navy in thirty to thirty-five hours, by which it could intercept and give battle to invading forces.

The Compulsory System. Under the compulsory system all men who are physically and mentally sound are required, when they reach the prescribed age, to enter the military or naval service. The term of service varies in different countries. In Germany each man must serve two or three years in the standing army, and the balance of the term of seven years in the reserve. In France, the requirement is three years in the active army, eleven in the reserve and seven in the territorial army, which is another branch of the reserve.

All European countries except Great Britain, Japan and the leading countries of South America have for years relied upon the compulsory system for military and naval defense, and under this system the Great Powers of Continental Europe have brought their armies and navies to a high state of perfection.

Voluntary or Compulsory Service. There has always been a difference of opinion among statesmen as to the relative advantages and disadvantages of these systems. Those who advocate the volunteer system claim that, except in case of the country's extreme peril, men should not be required to bear arms against their will; that compulsory service tends towards militarism, which is contrary to the principles of a democracy; and that the personnel of an army obtained by this system is of a higher order than that of an army obtained by compulsory service.

Those favoring the compulsory system claim that the voluntary system always fails in times of emergency; that it places the burden of defense upon a few when it should be borne equally by all male citizens of suitable age; that the fear of militarism is unwarranted by the history of the countries maintaining the compulsory system. The advocates of the compulsory system point to the military weakness of Great Britain at the outbreak of the War of the Nations in 1914, and to the condition of the military forces of the United States when they were called to mobilize on the Mexican border in 1916, and to the further fact that before Great Britain was able to secure an adequate army it was obliged to resort to conscription.

Conscription in the United States. During the War of Secession the Federal government was forced to resort to conscription, but the term of service ended at the close of the war. With the entry of the country into the War of the Nations in 1917 the government was confronted with the question of providing a large army in the shortest possible time, and the questions of voluntary and compulsory service were thoroughly discussed in Congress and throughout the country. While the voluntary system had many eminent advocates, the pressing need for an army turned the balance in favor of compulsory service, and in May a conscription law passed both Houses of Congress. The law provides:

1. That all civilian male citizens between the ages of twenty-one and thirty shall be registered for military service.
2. That the first draft of 500,000 shall be selective, occupation to determine exemptions.
3. That the total draft may call 1,000,000 men to the colors.
4. That each state shall supply its quota in such proportion as the population of such state bears to the population of the United States.
5. That no substitutes shall be allowed. If a man is drafted he must serve.
6. That the regular army shall be increased to 293,000 and the National Guard to 330,000.
7. That the total armed forces of the United States may be increased to 1,900,000 men.
8. That the pay of enlisted men be raised from $15 a month to $30 a month.

The exempted classes include the Vice-President, legislative, executive and judicial officers of the United States and of the several states; members of religious organizations whose creeds oppose warfare, and ministers. Provisional exemptions may be made by the President.

Military Instruction in Schools. State universities and other educational institutions may organize courses of military instruction, and upon approval of these courses by the Secretary of War they may have officers of the regular army appointed as instructors; military training is required in most state universities. It has also been instituted in numerous other schools of college grade, and has recently been extended to the high schools. This last work was instituted by Captain Edgar Z. Steever in the high school of Cheyenne, Wyo., in 1911, and it has been adopted by a number of other cities. The work is entirely voluntary and of such nature as to be physically beneficial to the boys. Those who advocate this line of training maintain that it is better than ordinary athletics.

Some object to military training in the schools on the ground that it will foster a warlike spirit which in time may give the country a large number of men inclined to lead the nation into war, and also on the ground that such training is contrary to the spirit and purpose of the public school system, and that boards of education have no right to use the school funds for such a purpose. W.F.R.

Related Subjects. The reader is referred to the following articles in these volumes:

Army	Navy
Conscription	War
League to Enforce Peace	War of the Nations

MILITARY SCHOOLS, academies and colleges where training in military science is added to the regular course of study. In the United States, in addition to the national academy at West Point, there are a number of boys' schools that offer military training. The students usually wear uniforms, learn how to drill and become in some degree acquainted with the strategy and tactics of war. There is also training in gymnastic and other body-building exercises. It is believed that the military organization and morale tend to promote in the

students desirable habits of self-reliance and willingness to obey orders.

All important civilized nations maintain such schools to drill their officers. The academy at West Point (see MILITARY ACADEMY, UNITED STATES) is one of the best-equipped schools in the world. The academic training is equivalent to that offered in other American colleges, the engineering course being especially fine. There the officers of the United States army receive their preliminary training in the profession of arms. Germany, Great Britain, Austria and France all have famous military schools, which have been maintained for a long time. The greatest French soldier, Napoleon Bonaparte, founded the celebrated school of Saint-Cyr in 1803. In Germany picked officers receive their higher training at the school at Berlin, founded by Frederick the Great. England trains its young officers at the Royal Military College at Sandhurst and at the artillery and engineering school at Woolwich. The chief Canadian institution is the Royal Military College of Canada, established in 1886 at Kingston, Ontario. A certain number of its graduates receive commissions in the British service. See ARMY.

MILITIA, *mi lish' a,* a term variously used, but meaning, in general, a body of armed citizens. In the British service the militia is the reserve force, or *second line.* In the United States, by militia is meant all able-bodied male citizens and all other able-bodied males who have declared their intention of becoming citizens, who are not under eighteen or over forty-five years of age. Certain Federal and state officials, workmen in armories, arsenals, etc., and members of certain religious sects are excepted. The militia is subdivided into the national guard, the naval militia and the unorganized militia, the latter consisting of the great body of unenlisted citizens.

The National Guard. This defensive arm is composed of the organized militia of the several states. The Hay-Chamberlain army reorganization bill, approved by President Wilson in June, 1916, provided for 800 enlisted men in the National Guard for each Senator and Representative in Congress, and a number to be determined by the President for each territory and the District of Columbia. Under this law, organizations of the militia cannot disband without the consent of the President, nor can their commissioned or enlisted strength be reduced below the minimum prescribed by the President without his consent.

The period of enlistment is now six years, the first three in the active organization, the second three in the National Guard Reserve. The qualifications for enlistment are the same as in the regular army. In time of war one reserve battalion for each regiment of infantry or cavalry and for each nine batteries of field artillery or each twelve companies of coast artillery may be brought into the service of the United States. This makes it possible for the President to draft about 800,000 militia without calling for volunteers.

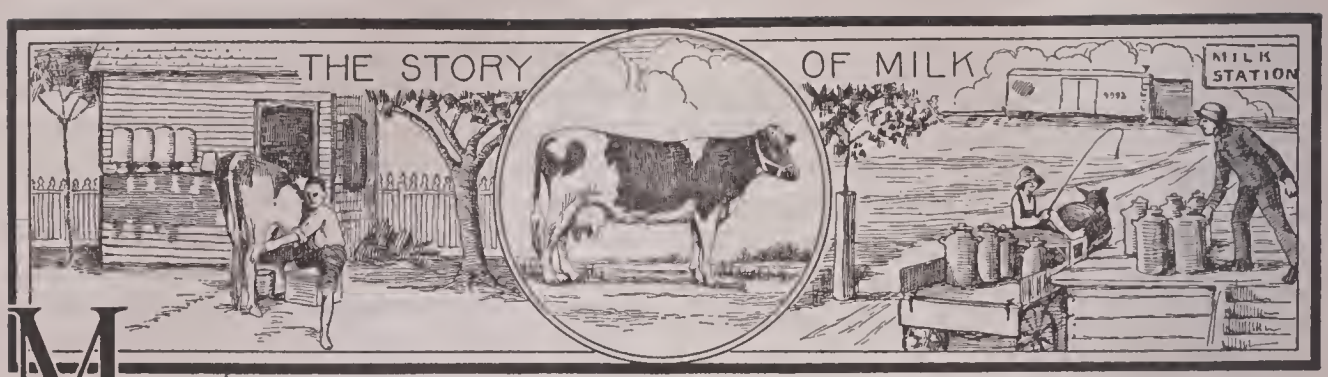
The law also requires a minimum of forty-eight times each year for assembly for drills and instruction, including indoor target practice, with instruction of not less than one and one-half hours' duration for each such period; the character of the instruction is to be prescribed by the Secretary of War. In addition, the militia organizations are to participate in encampments, maneuvers, or other exercises, including outdoor target practice, at least fifteen days in each year, unless excused by the Secretary of War.

Captains and higher grades receive $500 per year, first lieutenants $240 per year, second lieutenants $200 per year. Enlisted men are to receive twenty-five per cent of the initial pay of the regular army of the same grade, provided that the militiamen have attended not less than the forty-eight drills per year; and a proportionate amount of such pay if they have attended not less than twenty-four drills in the year. L.R.G.

Obligations to Militia Service. The Constitution of the United States declares that "The President shall be commander-in-chief of the . . . militia of the several States when called into the service of the United States," thus assuming that the several states would possess and make use of the power to demand of their citizens military service. The country, and under the country the state, gives to every citizen protection in any lawful enterprise he may undertake, and if such an enterprise is of public benefit, the government usually stands ready to furnish assistance as well as protection. In return the country has a right to expect that every citizen will, when it is necessary, be ready to defend its institutions and safeguard its borders.

Related Subjects. The reader is referred to the following articles in these volumes:

Army
Conscription
Landsturm
Landwehr
Military Preparedness
War, Department of



MILK, a fluid secreted by the female of all mammals for nourishing their young. The milk of domesticated animals, including cows, goats, sheep, asses and horses, has been used from the earliest recorded time as food for man. The milk of the cow, however, is the only one now in general use in the United States and Canada.

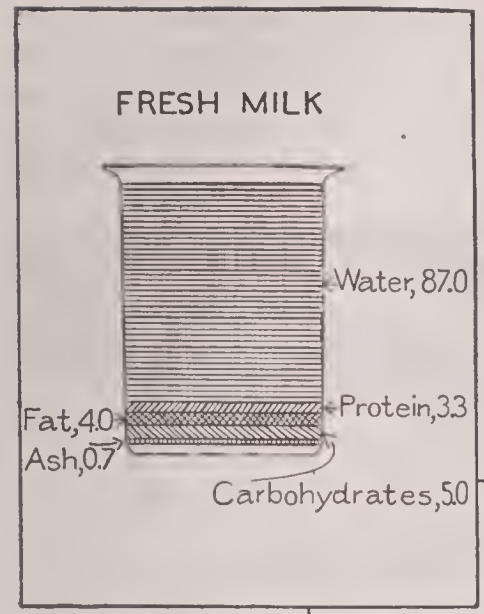
Cow's milk is of chief commercial interest and is also typical of all milks. It is an opaque, whitish fluid, sometimes slightly yellowish or bluish. Its specific gravity averages about 1.032; that is, it is about three one-hundredths heavier than water; a gallon of milk weighs 8.6 pounds. It requires five and one-half gallons of good milk to produce a gallon of cream, three and one-half gallons to make a pound of butter, and about one and one-third gallons to make a pound of cheese. Chemically considered, milk is an emulsion (which see) of globules of fat in a water-solution of casein, milk sugar, albumin and ash. The water usually comprises 87.2 per cent of milk; the fat is about 3.7 per cent; casein, 3 per cent; milk sugar, 4.9 per cent; ash and albumin, each less than 1 per cent. The milk from different animals varies considerably in its composition, as does also the milk from the same cow at different times. The percentages given are merely approximate standards.

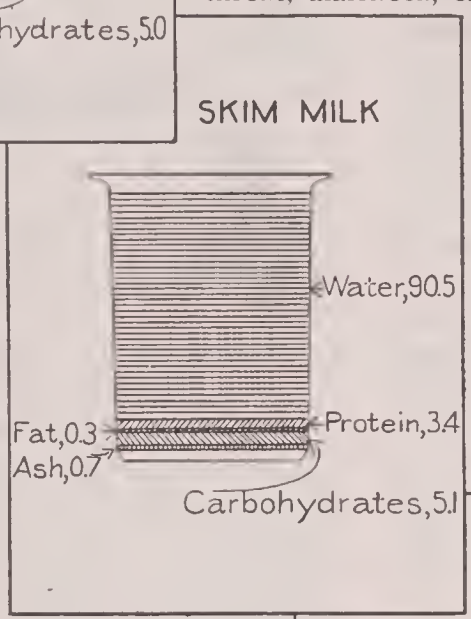
When examined under a microscope the tiny globules of fat can be seen. They vary greatly in size, from one fifteen-hundredth to one twenty-five-thousandth of an inch in diameter, but it has been estimated that on an average they are so small that one million of them are contained in a pint. If milk is allowed to stand in a cool place, these globules will gradually rise to the surface and form *cream*. It is from the cream that butter, which is about 85 per cent fat, is made. Milk from which the cream has been removed is called skim or skimmed milk.

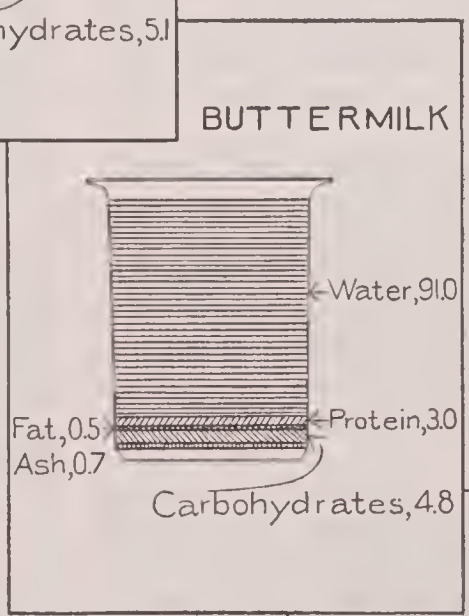
The richness of milk—that is, the percentage of fat, casein and other solids—has been increased by careful breeding and care of cows for centuries. The milk of wild cattle is not nearly so rich as that of domestic varieties. It is not true, on the other hand, that the proportion of milk fat can be permanently increased by feeding; so long as the food is ample and wholesome it seems to have no

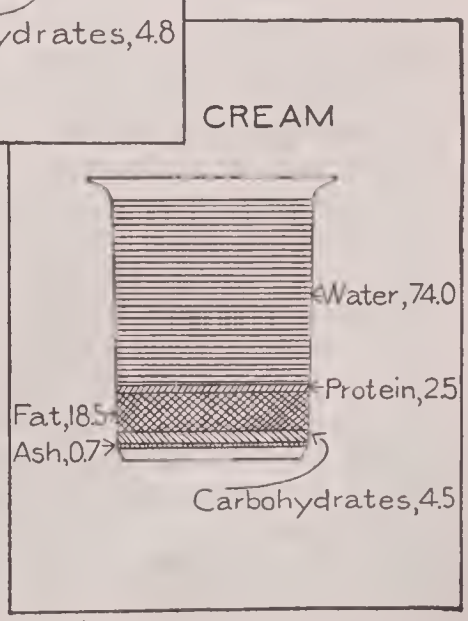
PRODUCTION IN A YEAR

effect on the quality of the milk. It has been noted, however, that there seems to be a direct transmission of certain volatile-oil constituents of feed to the milk, for example, when cows eat garlic and onions; and everybody is familiar with the change in flavor which occurs when the cows are first let out to green pasture in the spring.









more easily affected than those of adults. *Sterilizing* milk means heating it to a temperature of 212° F. (the boiling point) for an hour; in *pasteurizing,* the milk is not boiled, but is heated only to 155° F. or 160° F. for half an hour. Pasteurizing will kill the germs of the diseases mentioned above. But pasteurized milk will not keep indefinitely, and it should be used within twenty-four hours; sterilized milk if placed on ice will sometimes keep for two weeks. Milk need not be sterilized under normal conditions, but it should be in warm weather if no ice is to be had or if there is a suspicion that the cows are not healthy or the milk not carefully handled or if there is an epidemic of diphtheria, sore throat, diarrhoea, or any of the other diseases already mentioned. Pasteurized, or sterilized, milk should be cooled rapidly by placing the bottle or vessel in cold water, not by leaving it at the temperature of the room or in an ice box.

Care of Milk. Milk is extremely sensitive to outside influences, and its flavor and freshness are easily destroyed by the proximity to disagreeable odors. It readily absorbs odors from the stable, or from meats and vegetables in ice boxes. The care and handling of cows is discussed elsewhere, and it is only necessary here to mention certain general principles about handling milk. When freshly drawn it should be placed in closed vessels, and should be removed at once to a clean, dry room. It should be strained through a metal gauze and a flannel cloth, and should then be cooled to a temperature of 45° F., if it is to be shipped immediately, or to 60° F., if it is to be used at home or taken to a creamery. Fresh, warm milk should never be mixed with milk already cooled.

In the Home. Milk in the home should always be kept on ice, if possible, and in covered or closed vessels. All cow's milk, even when handled most carefully, contains germs, and when carelessly handled, or in warm weather, the number of them is enormous. While most of these are harmless, or cause nothing worse than the souring of the milk, occasionally there are others present which may produce scarlet fever, typhoid fever, tuberculosis and other serious diseases. Under ordinary circumstances the milk which is delivered by dairy companies is pure, but under certain conditions it should be sterilized or pasteurized, especially if it is to be used by children, whose digestion and general health are

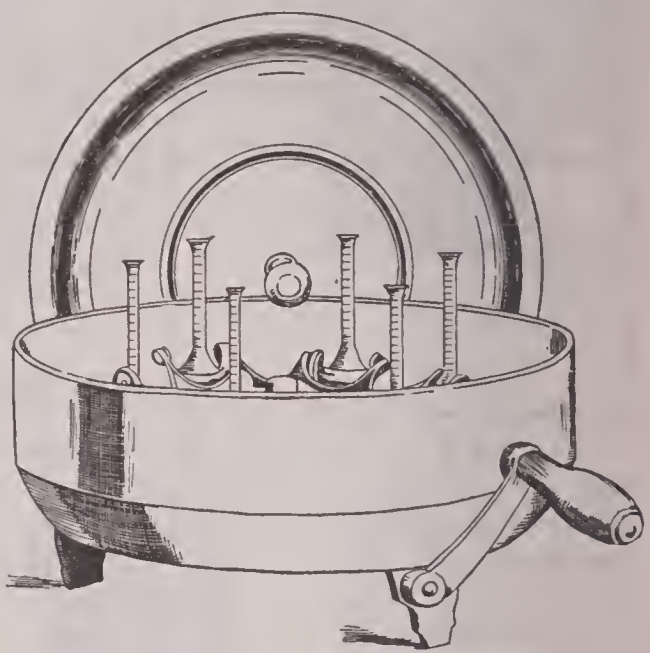
Milk as Food. Milk should never be drunk regularly as a beverage, but should always be considered as food. It is one of the best foods for man, because it contains the four classes of food material in more nearly the proportions of a correct diet than any other single food. These food materials are protein, fat, carbohydrates and mineral matter. A quart of milk contains four ounces of nourishing material, about the same amount as six ounces of bread or three-fourths of a pound of beef. This does not mean that they have the same value

as food; milk has protein, fat and carbohydrates about in equal quantity; bread has practically no fat, and meat has practically no carbohydrates. Either bread or milk alone is a better diet than meat alone, and milk and bread together are an excellent diet, especially for children. For adults, milk and bread should be supplemented by meat and other foods. In its uncooked form milk may be added to coffee, tea and chocolate, and it may be used in making bread, cake, pastry and many cooked foods. Cream, which contains most of the fat of milk, and butter, which is made from cream, are valuable for supplying energy. Cheese, which contains both fat and protein—that is, the casein—supplies building material for the body, as well as energy. Sour milk, containing bacteria which are not harmful when taken into the body, is used to a considerable extent in cooking, in making cottage cheese, and in the preparation of koumiss.

Babcock Test. This name is applied to a method of determining the amount of butter fat in milk, invented by Dr. S. M. Babcock of Madison, Wis. The apparatus consists of a closed cylindrical box containing a rack for holding bottles, so mounted that it can be revolved rapidly by hand power or by a motor, and several glass bottles, a pipette and an acid measure.

The first step in making the test is to mix the milk thoroughly by pouring it several times from one vessel to another, for the purpose of securing an even distribution of the butter fat. This should be done as soon as possible after the milk is drawn. The necessary quantity of milk for a test is then drawn up into the pipette and placed in the testing bottle. An equal quantity of sulphuric acid is then poured into the acid measure and then into the bottle containing the milk. The acid and milk are then thoroughly mixed by giving the bottle a rotary motion and at the same time shaking it gently. After several bottles, each containing milk from different lots, have been prepared they are placed in the centrifuge, which is rotated at a speed varying from 700 to 1,200 revolutions per minute, for about five minutes. A small quantity of warm water is then added to the bottles, and they are again rotated for about two minutes. If the work has been properly done, all the butter fat rises in the neck of the bottle, which is marked with a graduated scale that tells at a glance the percentage of butter fat that the milk contains, and therefore its richness.

Condensed Milk. This is fresh milk which has first been sterilized, and then reduced to about one-fifth of its bulk by the evaporation of part of the water it contains. In other words, about five quarts of fresh milk are required to make one quart of condensed milk. When fresh milk is brought to the factory it is placed in large storage tanks, from which it is drawn off into smaller copper tanks, each holding about 1,000 gallons. By steam heat the milk is brought to the boiling point, and is then strained into the sugar mixer, where the proper proportion of cane sugar is added. Usually the proportion is about seven ounces of sugar to one pint of milk. Some condensed milk is sold fresh and unsweetened; this is usually called "evaporated," to distinguish it from the sweetened, or condensed, variety. After the sugar is added the milk is placed in vacuum pans, heated to a temperature of 140° F., and evaporated until seventy-five to eighty per cent of the water is gone. The milk is thus reduced to a thick, pasty, cream-colored mass, which is taken to the cooler and then to the packing-room, where it is sealed in air-tight cans ready for shipment. E.H.F.



BABCOCK TESTER
A small machine, with hand power.

Consult Farrington and Wall's *Testing Milk and Its Products;* Wing's *Milk and Its Products.*

Related Subjects. The reader is referred to the following articles in these volumes:

Adulteration of Foodstuffs and Clothing	Casein
Albumen	Cattle
Butter	Cheese
Buttermilk	Cookery
Calorie	Dairying
Carbohydrates	Diet
	Food

MILK SNAKE, or **HOUSE SNAKE,** a harmless snake common in North America east of the Rocky Mountains, which gets the first of its two names from its fondness for visiting places where milk is kept. It is believed by

THE MILK SNAKE

some that it drinks milk, though this is disputed. The milk snake commonly lives upon mice which it finds in granaries and barns, and is far less harmful than the rodents it destroys. It sometimes grows to be four feet in length, and is dark gray above and yellowish beneath. Along the back and sides are black spots. It moves very quickly and climbs easily.

MILK'WEED, a widely distributed family of stout-stemmed plants, commonly known through their milky juices, curious little flowers and pods of silky seed tufts. Numerous species are found throughout America, the most beautiful being the brilliant butterfly weed. Best known of all, however, is the common milkweed, which flowers from June to September along roadsides, in fields and on waste places, from New Brunswick westward, and southward to North Carolina and Kansas. The stems grow about four feet high, bearing large, short-stemmed, hairy leaves of pale-green hue. Numerous purplish flowers grow in clusters at the tip of the stalk.

MILKWEED

These blossoms lure insects by their sweet odor, and are so wonderfully constructed that before the nectar-store is reached, the visitor's feet become entangled in a pollen mass. Some insects cannot break away, so perish, but others fly off with two bundles of pollen, strapped together like saddle-bags, securely attached to their legs. In this way cross-fertilization (which see) is insured. In the autumn large rough-coated seed pods take the place of flower clusters. When those pods burst open clouds of silky tufts bearing flat brown seeds float on the breezes and come to earth far away from the parent plants. New plants also grow from the creeping roots, so the milkweed becomes a troublesome weed. Cultivation and heavy cropping are the best means of removing this weed when it becomes a pest.

MILKY WAY, or **GALAXY,** *galaxi,* a luminous belt surrounding the heavens, caused by the radiance of countless millions of stars which form its circular path. It is divided for about two-thirds of its length into two parts, marked at intervals by dark patches. The stars in the Milky Way are all small, nearly all being of the eighth magnitude (see STAR).

The Milky Way crosses the ecliptic, at two almost opposite points, at an angle of 60° and not far from the solstices. The constellations Cassiopeia and the Swan are always in the Milky Way, and Sirius, Aquila and Capella are sometimes visible just on the edge of this silvery belt.

One of the dark spots seen in the Milky Way has been named the *Coal Sack* by sailors, because in it they could see no stars. If the earth could be removed to allow an uninterrupted view the Milky Way would be seen completely girdling the heavens.

MILL, JAMES (1773-1836), a Scotch philosopher, historian, economist and politician, called the founder of philosophical radicalism. Mill was a brilliant example of the type of man who is vitally interested in many intellectual fields, and more especially of the type which is logical in the highest degree. In all his writings he brushed aside the unessential details of a question and always endeavored to deal with first principles. Looseness of reasoning was unbearable to him, and he has well been called the "crusher of prevailing fallacies."

With the exception of his *History of India,* which was responsible at least in part for great changes in the government of that colonial possession, and is still a standard work, Mill's writings are little read to-day. Nevertheless, he holds a high place in history, for he influenced many young men who carried on his ideals and later won fame as great as, if not greater than, their teacher. Among them was his son, John Stuart Mill. He had high ideals of public service, and he lived according to them, though he risked all chances of material advancement. His influence on the Liberal politicians helped to crystallize the prevailing

views on the equality of men. The result of this effort was the Reform Bill of 1832.

Mill was born in a little village not far from Montrose, Scotland. His father was a pious, industrious shoemaker who was not known for remarkable intelligence, but his mother seems to have been keen and ambitious, and it was through her influence that James, her eldest son, was given a superior education. At seventeen he entered Edinburgh University, and in 1798 was licensed as a Presbyterian minister. A gradual change in his religious views led him to abandon the ministry, and in 1802 he settled in London, where he became a frequent contributor to periodicals and at times was also an editor. In 1818, after ten years of work, he completed the *History of India* above referred to, which won him a high position in the department which governed that great country. In 1830 he became chief of the Indian Office, where he remained until his death.

Of Mill's many books the most important are *Elements of Political Economy,* intended originally as a textbook for his son; *Analysis of the Phenomena of the Human Mind,* remarkable for its clearness and precision; and the *Fragment on Mackintosh,* in which he stated his views of utility as the basis of ethics.

MILL, JOHN STUART (1806-1873), one of the most advanced thinkers of his time, a student and writer in the fields of philosophy, political economy and logic. His name is especially associated with the ethical doctrine known as *utilitarianism,* that the greatest happiness of the greatest number should be the sole purpose of all public action (see UTILITARIANISM). In the field of logic, especially in the subject of inductive reasoning, he did work that ranks with that of Aristotle and Hegel.

He was born in London and educated entirely by his father, James Mill, the philosopher. He began the study of Greek when three years old, and when twelve had read more Latin than the average college graduate. When fourteen, he spent a year in France, and after his return to England studied law, history and philosophy until he became a clerk in the India House, in 1823. Here he remained for a period of thirty-three years, being gradually promoted to the head of his department. After his retirement he was a member of Parliament for about four years. He belonged to the Radicals, and was a warm advocate of suffrage for women. During the last years of his life he tried to help the masses of the English people by advocating measures which would secure a more equal division of the profits of property, and he also favored coöperative agriculture. Mill began his literary labors early in life. Among his principal works are *A System of Logic, Principles of Political Economy, Utilitarianism* and *England and Ireland.*

MILLAIS, *mi la',* SIR JOHN EVERETT (1829-1896), an English painter who was endowed with a wonderful power of story-telling on canvas and the ability to interest mankind. He was born at Southampton. In his earlier days he became a leader of the Pre-Raphaelite school, together with Rossetti and Holman Hunt (see PAINTING). From them his art took a strong leaning toward the imaginative and symbolical, and the richest and most poetic of the productions of this period are his *Autumn Leaves* and *The Vale of Rest.* In 1859 he abandoned the creed of the Pre-Raphaelites and thereafter drew his subjects from many sources, painting portraits of some of the most distinguished men of his day, landscapes, of which *Chill October* is one of his most renowned, and an occasional figure piece, as *The Northwest Passage.* The value of his later paintings lies in their splendid technical qualities. Many illustrations, appearing in the leading periodicals of his time, place him in the first rank among woodcut designers. He was created a baronet in 1885, and in 1896 was elected to the presidency of the Royal Academy. Among his other notable works are *The Minuet, The Boy Princes in the Tower, Spring* and *Ophelia.* His *Bride of Lammermoor* and *Portia* may be viewed in the Metropolitan Museum, New York.

Consult Reid's *Sir John E. Millais;* Bayliss' *Masters in Art.*

MILLENNIUM, *mi len' i um,* a word derived from the Latin *mille,* meaning a *thousand,* and *annus,* meaning *year,* designates a period of 1,000 years, during which, according to the belief of various sects, Christ will return to earth to rule before the end of the world. *Revelation* XX, 1-7 is quoted as authority for this belief. In the ancient Church it was generally believed that 1,000 years before the Lord were as one day of the creation as given by Moses; therefore the six days of creation would signify 6,000 years of toil and the Sabbath would represent 1,000 years of rest and happiness. Various teachers have gone so far as to appoint specific dates for the millennium, but there is wide disagreement on the subject. According to the general interpretation of the term the millennium is a period in the dim distant fu-

ture when the imperfections of humanity will have disappeared, and the highest degree of perfection and happiness will prevail.

MILLER, Cincinnatus Heine (1841-1913), best known as Joaquin Miller, an American poet, in life and verse thoroughly original and unconventional. The name *Joaquin,* which he adopted, was the name of a Mexican bandit of whom he wrote a defense. He was born in Indiana, but when a small child went with his parents to Oregon. The life of the new country was full of interest for Miller, and at the age of fifteen he ran away from home to live in mining camps and with the Indians in California. He was adopted by a certain tribe and married the daughter of the chief. After the death of his wife, who was killed in an accident, Miller returned to Oregon and studied law. He practiced for a few years and also edited a newspaper, but found his true calling to be that of a poet.

In 1871 Miller visited England, where he published his first notable collection of poems, entitled *Songs of the Sierras.* His colorful and musical verses, sometimes lacking in form, but full of a real love of the beautiful West and its romantic spirit, were enthusiastically received by the British public, and his picturesque Western dress, wide-brimmed hat, soft shirt, and trousers tucked into high boots, added to his popularity. His work, at first unappreciated in America, has gradually been accorded deserved recognition by his countrymen.

After his return to the United States, Miller engaged in newspaper work in New York and Washington, D. C. In 1887 the poet returned to California, where he made his home until the time of his death. Following his expressed wish, his friends burned his body and threw the ashes to the winds, on the slopes of the Sierras he had loved so well.

In addition to his *Songs of the Sierras,* his writings include *Songs of the Sunlands, Songs of the Mexican Seas* and a novel, *The Danites.* The latter has been dramatized with notable success.

Of Miller's single poems, none is better known than his spirited tribute to Columbus, which begins—

Behind him lay the gray Azores
Behind the Gates of Hercules,
Before him not the ghost of shores,
Before him only shoreless seas.
The good mate said, "Now must we pray,
For lo, the very stars are gone;
Brave Admiral, speak, what shall I say?"
"Why say, 'Sail on, sail on and on.'"

MILLET, *mil'et,* the common name for a number of cereal and forage grasses which have produced valued crops for centuries. In America millets are raised principally for hay, as soiling crops (that is, to be plowed under to enrich the soil), and for the seeds, which are used as poultry food. Almost 1,550,000 tons of millet, valued at about $11,146,000, are cut for forage annually in the United States; the largest crops are raised in Kansas, Texas and Missouri. In India about 40,000,000 acres of land are planted with millet for food purposes each year, and in Japan 35,000,000 bushels of millet

THREE VARIETIES
(*a*) Foxtail millet; (*b*) Hungarian millet; (*c*) broom-corn millet.

seed are ground into flour annually. The grain is used for bread in many other parts of Asia, and it is estimated that it supplies food to about one-third of the population of the world.

American millets may be divided into three groups; these are the foxtail millets, including that most important species, *Hungarian millet;* the widely-cultivated barnyard millets, which resemble barnyard grass; and the broom-corn millets, the common millets of Europe, a species which has loose, bushy grain heads.

Planting. According to location, millets are planted as early as May and as late as August. Most varieties are sensitive to cold, so seeding should be done when the ground is thoroughly warm. Hay crops, two or three tons to the acre, can be obtained from Hungarian millet within fifty to eighty days after planting. Rich, loamy soils are best for all millets, and soil preparation is the same as for other grasses. One-half a bushel of seed to the acre is usually sown broadcast. Millet is practically free from attacks of insects and plant diseases.

Value for Feeding. When used in limited quantities, and not continuously, millet hay is very satisfactory for farm animals. Used exclusively, it has been found harmful. Ripened seeds are valued for poultry and birds. Crushed and ground, millet seeds are sometimes fed to stock. Broom-corn millets are most highly valued in the United States for the latter purpose.

MILLET, *me la',* or *me leh',* JEAN FRANÇOIS (1814-1875), a French painter of peasant life and landscape, generally considered the greatest of the Barbizon school. Millet was himself a peasant. As a boy he had worked in the fields, had wielded the hoe and the pitchfork, and he knew peasant life in all its phases. As he knew it, so he painted it, neither softened nor exaggerated. His greatest pictures tell with truth a simple tale of everyday life on the farm. This life is presented with a pathetic dignity and an emotional appeal seldom equaled.

Millet was born in the north of France, in a little village near Cherbourg. His father, though only a poor peasant, was a man of strong character, and his simple dignity and piety created a home atmosphere which left a deep and lifelong mark on the ideals of his gifted son. Until his eighteenth year young Millet worked in the fields with the other men and boys, but during the noon rest-hour, while they slept, he made numberless sketches of the familiar scenes about him. His talent was recognized at home, and when the time came for a decision as to his future, the family decided in solemn conclave to give him the chance he wanted.

So he began his studies at Cherbourg, and in 1837, aided by a small pension from the town council, he went to Paris to continue them. For the next twelve years his life was miserable. He was poor, and he was out of sympathy with the conventional methods of the art schools of the day. He refused to follow the fashions in painting, and earned enough to buy his daily bread by painting cheap imitations of Watteau and other masters. At one time he left Paris and supported himself in Cherbourg by painting signboards. Meanwhile, he exhibited some of his paintings, including some classical and religious subjects, but it was not until 1848 that his first important picture, *The Winnower,* brought him general recognition.

The sale of this painting and the commissions which soon began to reach him enabled him to leave Paris and buy a cottage on the edge of the Barbizon forest. There he worked for the rest of his days, surrounded by scenes he loved to paint. There he painted the pictures which have made his name familiar the world over—*The Sower, The Reapers, The Gleaners,* one of his best works, *The Angelus* and *The Man with the Hoe.* These last three are among the world's great paintings. In *The Gleaners* Millet tells the story of the poor, for the three stooping women are not workers in the harvest field; their "gleaning" is of another kind. Among the peasants of many countries there has existed the custom, with the force almost of law, that after the harvesters have gathered in the grain the poor may come into the fields and pick up the bits that are left. Such are the three women of this painting. In *The Angelus* the painter reveals the simplicity and honesty of the peasant's religion. The peasant and his wife stop their work and reverently bow their heads in prayer, as the bells in the distant church sound the Angelus (which see).

Millet not only painted, but he produced many notable charcoal drawings and etchings. In these, as in his paintings, he drew from memory. To his habit is due in part the simplicity and breadth of his treatment. He needed no models to confuse him with details, but retained in his memory the broad and the typical features. The prevailing tones of nearly all his paintings are gray and brown, which frequently create a sad atmosphere well suited to the pathos of the subject. To the end of his days Millet was poor, if not in actual want, but soon after his death his paintings began to increase in value. In 1890, only fifteen years after his death, *The Angelus* was sold to a French collector for $150,000. R.D.M.

Consult Hurll's *Jean François Millet;* Turner's *Millet;* Tomson's *Jean François Millet and the Barbizon School.*

MILLVILLE, *mil' vil,* N. J., is a city in Cumberland County, in the south-central part of the state, forty miles southeast of Philadelphia and at the head of navigation on the Maurice River, twenty miles north of Delaware Bay. It is served by the West Jersey & Sea Shore Railroad, and by an interurban electric line, steamboats and barges. The city has an area of twenty-five square miles. The population, which in 1910 was 12,451, was reported by the state census of 1916 as 13,624 (Federal estimate).

Sand mining, manufactories of glass and glassware (especially chemists' goods), cotton goods, bleacheries and dye works are important industries. The city is a shipping center for

fish and produce. The annual value of all products is about $5,000,000. The Federal building, library and hospital are prominent buildings. North of the city is Union Lake Park, along the shore of an attractive artificial lake two and a half miles long and a mile wide. The city received its name from its industrial mills. It was incorporated in 1801 and was chartered as a city in 1886. The commission form of government was adopted in 1913. L.R.H.

MIL'NER, ALFRED, first Viscount (1854-), an English official whose name is associated especially with the history of British colonization in South Africa. He was born at Bonn, Germany, and was educated at Tübingen, at King's College, London, and at Balliol College, Oxford. Early in his career he served as a journalist under John Morley and William T. Stead, but his first public office was that of private secretary to the Chancellor of the Exchequer (1887-1889). Between 1889 and 1892 he held the office of Under-Secretary for Finance in Egypt, and on his return to England in the latter year he became chairman of the Board of Inland Revenue.

His appointment, in 1897, as High Commissioner for South Africa and governor of the Cape of Good Hope, was the beginning of a distinguished career in British South Africa. During the troubled period before the outbreak of the Boer War (see SOUTH AFRICAN WAR), Milner showed himself one of the clearest-minded and most reliable officials in the British service, and in 1901, while the war was still in progress, he was appointed governor of the Transvaal and Orange River colonies. He continued in office until 1905, when failing health compelled his retirement. In the words of a contemporary official, "He laid deep and strong the foundation upon which a united South Africa would arise to become one of the great states of the Empire." The esteem in which he was held was evidenced by a public address of appreciation, signed by over 370,000 persons, which was presented to him after his return to England. The title of Viscount was conferred on him in 1901. Lord Milner is the author of *England in Egypt* and *The Nation and the Empire.*

MILREIS, *mil'rase,* or *mil'rees,* the name of a coin and unit of the monetary system in Portugal and Brazil. It is divided into 1,000 *reis.* In Portugal it is known as the *crown,* or *coroa.* In the money of the United States and Canada the milreis of Portugal is worth about $1.08; that of Brazil, fifty-five cents. It would therefore require about fifty-two of the *reis* of Portugal to purchase in the United States or Canada a commodity valued at five cents. See COINS, FOREIGN.

MILTIADES, *mil ti'a deez,* (? -500 B.C.), an Athenian general who won the great and decisive battle at Marathon (which see). He first appears in history as tyrant of the Chersonese, and about 512 B.C. accompanied Darius on his Scythian expedition. When the Persians invaded Greece in 490 B.C. he became one of ten generals of the Athenian army chosen to resist the Persian invasion of Attica, each of the ten to command one day at a time. On the day of his command he particularly distinguished himself by winning at Marathon. In the following year the victorious general asked Athens for a fleet of seventy vessels, and made an attack on the island of Paros in order to gratify a personal revenge. He was wounded in this attack, and when its object became known he was impeached and ordered to pay fifty talents fine. As a talent represented in modern money a sum ranging from $1,700 to $2,000, it was a heavy penalty; being unable to pay he was sent to prison, where he died of his wound, and his son, Cimon, subsequently paid the fine.

MIL'TON, JOHN (1608-1674), an English poet and political pamphleteer, author of the most-honored poem in English literature, one of the world's great epics—*Paradise Lost.* Probably no one has better expressed the world's appreciation of this master of sublime and idealistic verse than Wordsworth in his inspired lines—

> Thy soul was like a star and dwelt apart;
> Thou hadst a voice whose sound was like the sea—
> Pure as the naked heavens, majestic, free;
> So didst thou travel on life's common way
> In cheerful godliness: and yet thy heart
> The lowliest duties on herself did lay.

Milton was born on December 9, 1608, in London, where his father, a musical composer and a man of considerable learning, was established as a scrivener (a kind of notary). The boy's early instruction was received from his father and from private tutors until, at the age of twelve, he entered Saint Paul's School. Here he studied Latin, Greek, French, Italian and Hebrew and became especially familiar with the poetry of Spenser, from whom he later acknowledged that much of his inspiration was drawn. By 1625 he was ready for admission into Christ's College, Cambridge, and for seven years remained at the university, devoting himself chiefly to the study of literature and pro-

ducing several excellent poems, among them the *Hymn on the Nativity.* For some reason, perhaps because of the refinement of his manners and the sternness of his morals, Milton was not popular at the university, where his good looks won for him the name of "the Lady of Christ's College." Before his graduation, however, his unusual abilities were fully recognized.

Early Training. From his earliest years Milton showed a fine spiritual nature, and his par-

JOHN MILTON
From an engraving executed by George Vertue.

ents had decided that the Church was his proper calling. However, when Milton left Cambridge he found himself not in sympathy with the methods pursued by the clergy, and determined to devote himself to literature. His father, who had always shown himself most willing to provide for the development of the unusual powers which he recognized in his son, did not fail him now, but made it possible for him to have a six-year period of seclusion at Horton, in Buckinghamshire. During this time Milton pursued his studies most diligently and produced the lyrics that are regarded as the most nearly perfect of his poems. These were *L'Allegro* and *Il Penseroso,* the first describing the aspects of life which appeal most to a cheerful man, the second, those aspects in which a serious and meditative man finds most charm; the masque *Comus,* in which the beauty and irresistible power of virtue are celebrated; and the elegy *Lycidas,* written in memory of the death of his college associate, Edward King.

Period of the Commonwealth. His retirement came to an end in 1638 when he took a trip to Italy, making the acquaintance of some of the most famous men of his day. He had been abroad not much more than a year, however, when he learned of the civil struggle which was threatening at home and returned at once to England, settling in London. Identifying himself with the Puritan party, he became the chief literary defender of the principles for which that party stood and which led in time to the civil war. After the establishment of the Commonwealth Milton was made Latin secretary to the council of state, and in this office was called upon to translate into Latin foreign communications and other public documents. In 1643 he married Mary Powell, the seventeen-year-old daughter of a royalist squire; but his severity was so displeasing to the somewhat frivolous girl that she left him a month after the marriage and did not return to his home for two years. Their life from that time on seems to have been fairly pleasant. She died in 1652, leaving three daughters. His domestic unhappiness led to his writing *The Doctrine and Discipline of Divorce* and *The Tetrachordon,* in which he expressed the most extreme and distorted views. The unfavorable reception of these two caused him to write the *Areopagitica,* a defense of the freedom of the press, the best of his prose productions. Among his tracts written in defense of the Puritan party and the Commonwealth may be mentioned the *Pro Populo Anglicano Defensio* (Defense of the English People), *The Tenure of Kings and Magistrates* and *Eikonoklastes.*

His Blindness. For several years Milton's eyesight had been gradually failing, and in 1652 he became entirely blind, but with assistance was able to keep on at his work of Latin secretary until the Restoration in 1660. During this period (1656) he married Catharine Woodcock, who died in 1658, and in whose honor one of his most beautiful sonnets was written. Five years later he again married, practically driven to the step by the condition of affairs in his home. His three daughters, so early left motherless, had been sadly neglected, and grew up uneducated, selfish and thriftless. They com-

plained bitterly when called on to read to their father, and they even went so far as to sell some of his most valued books without his knowledge. Elizabeth Minshull proved a devoted wife, and Milton's last years were passed in peace and comfort.

After the Restoration. After the return to power of the royalist party, Milton narrowly escaped the fate which other prominent supporters of Cromwell met. The last years of his life were spent in retirement and were devoted to the composition of a work for which he had

MILTON'S HOME

This building stands in Chalfont Saint Giles, little changed in appearance since 1665, when Milton fled to it from London to escape the plague. In this cottage he wrote *Paradise Lost.*

been planning for many years. He had considered several great themes before he finally fixed on *Paradise Lost* as the subject of the sublime epic which he published in 1667. Written in a style of impressive grandeur, this work represents such colossal figures as Satan and his fallen angels and the hosts of God engaged in conflict. *Paradise Regained,* a second epic, and *Samson Agonistes,* a tragedy which follows closely Greek models in construction, show a decline of Milton's power. These were both published in 1671, and three years later occurred the poet's death. He was buried in Saint Giles's Church, Cripplegate, London.

His Literary Rank. Milton's literary life divides itself naturally into three parts: the period spent at Horton, that in which he was actively in politics, and that of his final retirement. In the first period he reached a height of lyric excellence which not only he himself never attained again, but which few, if any, other English poets have reached. The prose works of the second period are elegant in style, and must have been powerful in effect in their time, but they are often biased in sentiment and violent in tone. They were of such nature, moreover, as to rouse little interest beyond their own day. A number of sonnets are the best products of this second period, that *On His Blindness* ranking with the greatest of English sonnets. In the epics the delicate beauty and airy grace of the early poems are largely replaced by majesty and sublimity, in which he was unsurpassed. All in all, he is entitled to a rank among English poets second only to Shakespeare.

Among well-known quotations from Milton may be given the following:

Where glowing embers through the room
Teach light to counterfeit a gloom.

Where more is meant than meets the ear.

And storied windows richly dight,
Casting a dim, religious light.

Peace has her victories
No less renown'd than war.

They also serve who only stand and wait.

C.W.K.

Consult Jenks' *In the Days of Milton;* Williamson's *Milton;* Woodhull's *The Epic of Paradise Lost.*

MILTON, Mass., a town of Norfolk County, which played an interesting part in the dramatic history of Revolutionary times. On the summit of Great Blue Hill, the highest of the Blue Hills, which lie almost entirely within the limits of Milton, huge signal fires were kindled to announce to the people events of special interest and importance. The repeal of the Stamp Act, the adoption of the Declaration of Independence, the surrender of Burgoyne and of Cornwallis and other similar events were so heralded, and the patriots came to have a special affection for the Great Blue Hill. To-day its summit, 635 feet above sea-level, is crowned with a meteorological observatory.

The town, which is now a residence suburb of Boston, was founded in 1640 and given the Indian name of Uncataquissett. It was originally a part of Dorchester, but was incorporated separately in 1662 and given the name of Milton, either because some of its prominent men came from Milton Abbey, in England, or because it had gristmills and paper mills, Milton being a shortened form of Milltown. To-day the manufacturing industries include the making of chocolate, paper and crackers; the raising of garden stuff, which finds a ready market in the near-by city of Boston, and the quarrying of granite. Milton is six miles from Boston, on the New York, New Haven & Hartford Railroad, and had in 1910 a population of 7,924.

MILWAUKEE, *mil waw' kee,* WIS., the largest city of the state, and the county seat of Milwaukee County, is situated in the southeastern part of the state on the western shore of Lake Michigan, at the point where it receives the waters of the Milwaukee River. Exceptional transportation facilities are offered by the Chicago, Milwaukee & Saint Paul, Chicago & North Western, Minneapolis, Saint Paul & Sault Sainte Marie, Pere Marquette and Grand Trunk railways; the last two make connections with the city by ferries across the lake. Additional transportation is afforded by fifteen lines of steamers which communicate with all important ports on the Great Lakes. Interurban lines connect with Port Washington and Sheboygan, north; Waukesha, Oconomowoc and Watertown, west; and Racine, Kenosha and Chicago, south. The population increased from 373,857 in 1910 to 436,535 in 1916 (Federal estimate). For many years people of German birth predominated; but recently, Poles, Italians, Russians, Dutch, Bohemians and Scandinavians have entered the ranks from other nations, and at present only seventeen per cent are German born. The city occupies twenty-four square miles, a smaller area than that of any other city of the United States of about the same size, but it does not present the uncomfortably crowded conditions so frequently a feature of great cities.

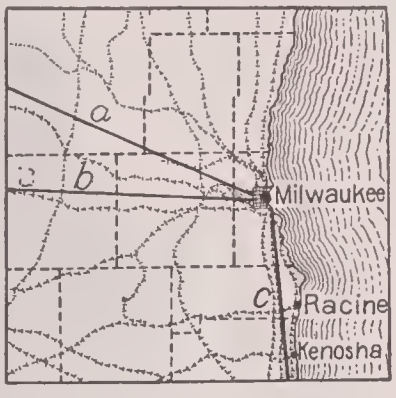
Suburbs. The population has spread into several suburbs of considerable size, among these being West Allis, containing the immense machinery plant of the Allis-Chalmers Manufacturing Company; Wauwatosa, where are located a National Soldiers' Home occupying 400 acres, the State Fair Grounds, a group of county institutions, including almshouse, hospitals and asylums, a number of industrial establishments, a Carnegie Library, Lutheran homes for the aged and orphans, stone quarries, large market gardens and nurseries; Cudahy, largely devoted to meat-packing, heavy machinery and rubber industries; South Milwaukee and North Milwaukee, with large manufacturing establishments; and Saint Francis, the seat of Pio Nono College and other important Roman Catholic institutions.

Parks and Boulevards. Milwaukee has a beautiful location on a bluff overlooking Lake Michigan from a height of 150 feet. Much of the residence district is built on this bluff, and it is noted for its attractive shaded avenues and handsome dwellings. Grand Avenue, Prospect Avenue, Waverly Place and Lake Drive are classed with the finest streets in the Union. The city has assigned about 1,000 acres to its thirty-six parks; of these, Juneau Park, extending along the lake bluff, is the most picturesque; it contains statues of Leif Ericsson, the navigator, and Solomon Juneau, founder of the city. Lake Park, also on the shore; Evergreen Park, the largest; Mitchell Park, with its rare collection of plants and flowers, and Washington Park, with its zoölogical garden, are among the other noteworthy recreation grounds. Statues of Solomon Juneau, the founder of the city; Ericcson, Goethe, Schiller, Burns and Kosciusko and a soldiers' monument occupy conspicuous positions in advantageous spots in the city.

Buildings and Institutions. Milwaukee has a number of fine public and office buildings. Formerly so many of the residences and store buildings were constructed of cream-colored brick, a product of the vicinity, that the city became known as *The Cream City.* Other building stones have recently been used in the construction of some of the noteworthy buildings,

which include the city hall, the $3,000,000 Northwestern Mutual Life building, built of marble, the Marshall and Ilsley Bank, First National Bank and the Wells, Pabst and Majestic buildings, the $2,000,000 granite Federal building, and the county courthouse, constructed of brown sandstone. Other prominent structures are the public library and museum containing 288,360 volumes and a noted collection of firearms; the Auditorium, the Art Gallery and the Jesuit, Saint Paul's (Protestant Episcopal), and Immanuel (Presbyterian) churches.

Milwaukee is the see of a Roman Catholic archbishop and a Protestant Episcopal bishop. It is a city of homes, numbers of laborers owning their dwellings. There are about 190 churches, and a fine public school system which provides for the education of the blind and the deaf, a business school, a fresh-air school and a school of trades for boys and girls, the first of its kind in the United States. In addition to these there are parochial schools, Marquette University (Catholic), Concordia College (Lutheran), Milwaukee-Downer College and Milwaukee-Downer Seminary, both for women, Wisconsin Industrial School for Girls, the National German-American Teachers' Seminary and one of Wisconsin's state normal schools. Of the city's eighteen hospitals, Saint Mary's and Mount Sinai, modern, excellently-equipped institutions, are the most noted.



LOCATION MAP

(*a*) To Saint Paul, 325 miles; (*b*) to Madison, 82 miles; (*c*) to Chicago, 85 miles.

Commerce and Industry. For commercial purposes the city has a fine location on the Milwaukee River and its tributaries, the Menominee and Kinnickinnick rivers, which have been widened to permit vessels to enter the heart of the city, making the harbor one of the best on the Great Lakes. These rivers divide the city into three sections, which are connected by a number of viaducts and bascule bridges, and the shipping facilities they provide contribute toward making the city one of the chief manufacturing and commercial centers of the north-central section of the United States. The principal articles of its extensive commerce are wheat, barley, oats, corn, rye, flour, lumber, coal, iron ore and salt. The annual receipts of grain amount to 87,000,000 bushels, and the grain elevators have a storage capacity of 16,500,000 bushels. In the production of flour it has a high rank among the cities of the United States.

One of the most prominent industries, and one for which Milwaukee is famous, is that of brewing, the annual product exceeding 4,000,000 barrels of beer. There are also vast rolling-mills, and manufactories of leather, in which it ranks second in the United States, and iron, steel and heavy machinery; in the three last named, nearly 22,500 people are employed, the annual output being estimated at over $61,000,000. Two of the city's tanneries are among the largest in the United States. Other important manufactures include boots and shoes, malt, electric and telephone supplies, railroad equipment, furniture, stoves and furnaces.

History. Father Marquette and Louis Joliet were the first Europeans known to have visited the site of Milwaukee (1673), and about a century later a French fur-trading post was established here. In 1818 Laurent Solomon Juneau and several associates built their homes and began the settlement of the city, Juneau being generally considered the founder. The east side was platted in 1835; the settlement of the west side soon followed, then the third settlement on the south, known as Walker's Point, was platted independently. These three settlements were incorporated as the city of Milwaukee in 1846, and Solomon Juneau was elected the first mayor. Immigration from Germany began in 1840, and continued for half a century, bringing to Milwaukee many Germans of the educated class, and for many years German customs prevailed. During the War of Secession an entire company was formed of German Turners. The first newspaper, the *Advertiser,* was published in 1836, and the first bank was established in 1837. In 1851 the first train sped over the Chicago, Milwaukee & Saint Paul Railway to Waukesha. Chicago was connected by telegraph in 1849 and by rail in 1856. The city was visited by a fire in 1892; about 2,500 people were made homeless by the destruction of 300 buildings, the loss being estimated at $6,000,000. Milwaukee is an Indian name which means *good land.* H.A.P.

MIMEOGRAPH, *mim'e o graf,* a copying device invented by Thomas A. Edison. The original mimeograph consists of a steel plate about eight inches long and three inches wide, with a large number of very fine lines engraved on

its surface; a frame for holding a sheet of paper coated on one side with paraffin; a stylus for writing, a bed plate, and an inked roller. The prepared paper is laid upon the steel plate wax side up, and the stencil made by writing on the paper with the stylus, the steel plate cutting through the paper so that ink passes through. The stencil is placed in a frame attached to the bed plate by hinges. The bed plate consists of a frame holding the steel plate and a piece of slate, upon which the paper to receive the print is laid. The copy is made by passing the inked roller over the stencil, using enough pressure to force the ink through. By working carefully several hundred copies can be made from one stencil.

The original mimeograph is now seldom used. The typewriter has taken the place of the corrugated steel plate and the stylus, and a cylinder to which the stencil is fastened and which contains an automatic inking device takes the place of the old frame and bed plate. As the cylinder revolves, the paper to be printed is fed into the machine. A mimeograph of this pattern operated by an electric motor will print 5,000 copies an hour.

The mimeograph is also used for making copies of drawings, report blanks and other forms. A device known as the mimeoscope is designed especially for this work. Prices of mimeographs range from $15 for the old-style pattern to $160 for the most complete machine with an electric motor.

MIMICRY, *mim'ik ri,* a term frequently used for protective coloration or protective resemblance, with reference to certain insects, birds, etc. It is described under the title PROTECTIVE COLORATION.

MIN'ARET, a slender structure of stone or brick, forming the tower of a mosque. It consists of several stories marked by balconies, is cylindrical or polygonal in shape and terminates in a pinnacle or small dome. Each mosque has one or more minarets; the mosque at Mecca has the exceptional number of seven. The Mohammedan's call to prayer is not by bell, but by the voice of an official termed *muezzin* (see below). The minarets of Spain, Egypt, Syria, India, Persia and Turkey, constructed between the thirteenth and sixteenth centuries, are among the most beautiful and original works of Eastern architecture.

Muezzin, *mu ez'in.* Five times daily the devout Mohammedan, wherever he may be, turns towards Mecca and prays, and the muezzin is the one whose duty it is to call the time for these prayers. He stands on the balcony surrounding the minaret, or prayer tower of the mosque, or if this is small and has no such tower, he stands at the side of the building. At dawn, at noon, at four in the afternoon, at sunset and at nightfall, the muezzin calls to prayer, each time saying, "Allah is great. I testify that

THE CALL TO PRAYER

Mohammed is the Apostle of Allah. Come to prayers. Come to salvation. There is no god but Allah." It is an honor to hold the office of muezzin, and one who does so is assured of heaven.

MINAS BAY, or **BASIN OF MINAS,** *mi' nahs,* the name of the southeast inlet of the Bay of Fundy, extending into Nova Scotia about fifty-five miles. On the south shore of this bay is situated the village of Grand Pré, celebrated in Longfellow's beautiful *Evangeline.* The tides rush into Minas Bay with great force, sometimes, at the equinoxes, reaching a height of sixty to seventy feet. In Halifax harbor, on the southeastern coast of Nova Scotia, the spring tides rise only to a height of six to nine feet. The principal river emptying into Minas Bay is the Avon, on whose banks are situated Windsor and other flourishing towns. See EVANGELINE.

MIND. There are but two entities in the world—*mind* and *matter.* Many learned men have defined them, with more or less success, but possibly the difference between the two has been as clearly stated by a shrewd layman. When asked, "What is matter?" he said, "Never mind;" and to the inquiry, "What is mind?" he replied, "No matter." All that is really known is that the mind is the principle in human beings which thinks, feels, wills, remembers, desires and reasons. No one knows just what it is, or what it is made of, and many theories have been advanced to account for its existence and its functions. Notwithstanding the great differences in these theories, however, all psychologists at the present time agree that the mind and body are interdependent, that each depends upon the other for existence. Somewhere the mind and body make a vital connection, although no one yet has discovered where the connection lies. Men smile when pleased, frown in anger, quiver with fear; mental emotions somehow send their messages to the nerves and muscles, so that there is an outward physical expression of every mood and shade of feeling. Mental depression can produce actual physical sickness; the value of cheerfulness in helping to cure diseases is well known. Any excitement, whether pleasant or unpleasant, affects digestion.

On the other side, there is a strong influence of the body on the mind. Everyone can note for himself the difference in his feeling of well-being, in his emotions, when he is hungry or satisfied, in pure or impure air, in cold or warmth, in health and disease. All of this is a mystery to psychologists, philosophers and biologists. This mystery of the relation of the mind to the body and the body to the mind forms the greatest problem of metaphysics, and is called the mind-and-body problem.

For the development of the mind, see PSYCHOLOGY, subhead *Development of Mental Powers.* Consult Baker's *Elements of Psychology;* Maher's *Psychology;* for young people, Baldwin's *The Story of the Mind.*

MIND READING. The belief in a possibility of communication between mind and mind apart from the recognized use of the senses is an ancient one. It appears in the popular beliefs in second-sight; also in the clairvoyance of mediums and the accrediting of special powers to seers. The attempt to give the thesis a scientific expression and test gave rise to the term *telepathy* (which see). While some investigators have become convinced of the irregular action of such a force, the general verdict is entirely against such a supposition. The support of such a view lies in a type of "reading" which may be referred to the acute interpretations of subconscious and involuntary indications. Under this view the process should be called *muscle reading,* and not mind reading.

When the muscle reader attempts to find a concealed object, he places the hand of the person who knows the place of hiding upon his forehead or arm, and by tentatively taking a step in this and that direction and feeling the resistance or yielding of his guide, takes a route more or less irregularly to the concealed object. He is guided by the involuntary yielding and resistance. With a favorable subject the promptness and delicacy with which the movements may be interpreted make possible an amazing performance. The numbers of bank notes may be selected by guiding the hand over the digits from 0 to 9. Experiments have shown any thought sets up a slight, involuntary tendency to move or incline in the thought-of direction; involuntary whispering has been similarly observed. It has been established that animals associated with man—horses and dogs—observe such indications. This power explains some of the otherwise incredible performances of trained animals; the performer (often sincere in his belief in the animal's mind-reading) gives an involuntary indication which the animal detects and responds to. On the other hand, the public performances of mind-reading in which messages are read depend upon a code or other device. J.J.

Relating to Various Beliefs. The articles on the following topics, while not bearing directly on the subject treated above, may be of interest in this connection.

Alchemy
Astrology
Clairvoyance
Conjuring
Demonology
Divination
Faith Cure
Hypnotism
Magic
Medium
Mesmerism
Necromancy
Occult
Palmistry
Phrenology
Physiognomy
Psychical Research
Psycho-Analysis
Spiritualism
Subconscious
Suggestion
Superstition
Telepathy
Theosophy
Trance
Witchcraft

MINERALS AND MINERALOGY. Everything in or on the earth, everything which man sees or knows about, belongs to one of two great classes: either it is alive or is the product of life, or else it has no life. The first division

includes all forms of animal and plant life; the second division includes all minerals.

What Is a Mineral? Animals and plants have their beginning; they grow up, and they die after a longer or shorter existence. Animals have organs, which they use for eating, drinking, breathing and other purposes. Most animals are able to move from place to place, and even those which are unable to move about —the coral, for example—are able to move parts of their bodies. Plants are simpler in structure than animals, yet they, too, have organs for various purposes. Minerals, on the other hand, have no organs, and show no signs of life. A mineral does not grow by assimilating food, but by additions from the outside. A piece of mineral may be broken into a dozen pieces, but each piece is exactly as much a mineral as before. In an animal or plant, however, each part has a special purpose, and it is maimed or destroyed if it is cut into pieces.

This difference between minerals and animals or plants can be expressed in a more scientific way by saying that a mineral is *homogeneous;* in other words, every part of it is like every other part. An animal is composed of bones, flesh, blood, skin, hair or fur and the like, whereas a mineral is only one thing. A gold nugget is only gold, and every part of it is gold. This does not mean that a mineral cannot be divided into its components. On the contrary, one of the essentials of a mineral is that it has a definite composition which may always be expressed by the same chemical formula. Every mineral is composed of one or more *elements,* usually two, in a fixed proportion. See CHEMISTRY, subhead *Elements.*

A mineral, strictly defined, is a "substance of definite chemical composition which has been directly produced by the processes of inorganic nature." Products of the laboratory or furnace are not minerals, although they may be similar to them. Coal, which is a vegetable product, is not a true mineral, but it is usually treated as one for convenience because it is formed like a mineral and has many of the characteristics of minerals. With the exception of water and mercury (quicksilver) all minerals, in their normal state, are solids.

Difference between Minerals and Rocks. Minerals, it is understood, are elements in chemical combination. Rocks are large masses of minerals in physical or mechanical combination. A few rocks, to be sure, are composed of only one mineral; marble is one of these. But most rocks are composed of a mixture of two or more minerals, and these minerals are not always present in the same proportion. A lump of granite contains quartz, feldspar and mica; it is still granite whether there is little mica, or much, whether there is little quartz or whether quartz forms half the rock. In a piece of granite, the mica is there as mica, the feldspar as feldspar, and the quartz as quartz. If a piece of granite is crushed to fine bits, the pieces will be pieces of mica, feldspar and quartz, not of granite. A mineral, when it is pure, always has the same weight per unit of measure. The weight of a rock, such as granite, varies with the percentage of minerals composing it. A rock has no particular form or color; these characteristics depend on the minerals of which it is composed.

Distinction between Metallic and Nonmetallic Minerals. Minerals may be divided into two classes, *metallic* and *nonmetallic.* The metallic minerals are opaque and usually have a shining appearance, or metallic luster. When polished they reflect light like a mirror. As a rule metallic minerals are heavy. From them is extracted most of the gold, lead, silver, iron, tin and zinc of commerce. The nonmetallic minerals are transparent, at least on thin edges. Many are glassy in appearance. Most of them are not heavy. Gold, silver and hematite are metallic minerals. Quartz, feldspar and calcite are nonmetallic. Most of the minerals composed of but one element are metallic, but sulphur and the diamond are exceptions. The majority of metallic minerals are compounds of two or more elements. Such are galena, the ore of lead, and chalcocite, the dark copper ore. A few minerals, such as the dark mica, are metallic in appearance, but are transparent and in other ways are unlike metallic minerals. They are called *submetallic.*

Origin and Formation of Mineral Deposits. It is now generally believed by scientists that the interior of the earth is not hollow, but is composed of great masses of minerals. Just how the minerals reached the surface nobody knows, but from natural processes which can be seen in operation to-day scientists reason by analogy about the past. Almost all of the important minerals, moreover, have been successfully produced artificially, and the information gained by experiment has thrown considerable light on the formation of natural minerals. All minerals, apparently, once existed in a fluid or molten state, and became solids in one of three ways. Each of these ways is best understood from an example.

Salt, a mineral by *crystallization.* A cup of water, in which has been placed a quantity of salt, will show how the great salt deposits in various parts of the earth have been formed. When all the salt that will dissolve has been put in water, the solution is said to be *saturated;* that is, the water will take up no more salt. If this cup of salt solution is placed in the open air the water will slowly evaporate, and little crystals of salt will form on the sides of the dish. When the water is completely evaporated, tiny salt crystals will be found on the bottom and sides of the dish. In this manner soda, borax and rock salt deposits are formed; these minerals were once in solution in the water of ponds and lakes, and when the water, for one reason or another, dried up or changed its position, the mineral deposits, more or less mixed with mud, were left on the bottom. Most of the great iron deposits were formed in a similar way, although usually the bogs or beds of liquid were slowly subjected to great pressure and underwent a change to the crystalline form.

Salt and many other minerals were once dissolved in water deep down in the earth. Sometimes the water was hot, a condition sufficient to cause solution, and often it held a number of minerals which acted on each other to preserve the solution. In the course of ages the water was forced upward toward the surface of the earth and gradually became cooler. The pressure on it became less, and little by little the minerals which it had carried in suspense were deposited. As these deposits dried and hardened, veins of quartz, calcite, gypsum, gold and other minerals were formed. The many mineral springs which are still flowing in every part of the earth show us how these veins were formed centuries ago.

Sulphur, a mineral by *condensation.* A few minerals seem to have existed in the earth's interior in the form of vapor or gas. As this vapor found its way toward the surface, it was cooled and condensed on the walls of the cracks in the earth's crust. Here it is often mixed with other minerals, such as iron pyrites, but it is also found in the pure state. This method may be illustrated by a simple experiment which any parent or teacher can conduct. Take a little sulphur and place it in a glass tube closed at one end. If the sulphur is heated over the flame of a lamp, it will soon begin to change to a brownish-yellow vapor. The vapor will rise in the tube, and when it reaches a cool part will condense on the sides. The upper part of the tube will be covered with little yellow specks.

Quartz, feldspar and other igneous minerals. Igneous fusion is the third method by which minerals were formed. This means that a great mass of mineral matter was once heated (*ignis* is the Latin for *fire*) to a fluid condition. As the fluid slowly cooled the different elements grouped themselves according to their chemical attractions, or likes and dislikes, as they might be called. Molecules of feldspar will form and attract others; molecules of hornblende, of quartz and other minerals will do the same. When the whole mass is finally cooled there will be distinct smaller masses of each mineral. If, however, the molten mixture cools rapidly, the molecules of the different molecules will not have time to group themselves, and they will form a mass like obsidian, or volcanic glass.

Characteristics of Minerals. No matter where or how a certain mineral may have formed, its characteristics are nearly always the same. Quartz always tends to assume certain geometrical forms. Its hardness, specific gravity, luster and the way it conducts light and heat are about the same in all specimens, no matter whether they have crystallized from a lava or from waters underground. To a certain degree, the characteristics of a mineral depend upon the element or elements which it contains, but other less-known factors also contribute to the individuality of a mineral. Graphite and diamond are both pure carbon; one is soft, the other hard. Graphite is black and greasy; the diamond is transparent and sparkling. Copper when pure is reddish and metallic. Malachite, a combination of copper, carbon dioxide and water, is green. Azurite, which has the same ingredients as malachite, but in different proportions, is blue. Both malachite and azurite, unlike native copper, are nonmetallic. The study of the characteristics of minerals is one of the principal functions of mineralogy.

Mineralogy, the Science of Minerals. In addition to the study of the origin and occurrence of minerals and their classification, mineralogy treats of the characteristics of minerals. These may be divided into three kinds—the morphological, the physical and the chemical characters; these are discussed below.

Crystallography. This branch is morphology, that is, the study of form. Crystallography includes the description of crystals, their character and classification, besides the methods

used to express them in signs and symbols. While it is true that all minerals, except mercury and water, are solid substances, they were once fluids. When a mineral, which is a homogeneous substance, passes from a fluid to a solid state, its particles attract each other along definite lines and build up a solid which shows by its outward form that there is a definite relation between all its parts. Such a solid is a crystal.

Physical Mineralogy. This branch deals with the physical characteristics of minerals, their hardness and weight, transparency or translucency, color and luster, elasticity, malleability, tenacity, ductility, and finally their effect on the senses of touch, taste and smell.

Chemical Mineralogy. The chemical composition is the most important characteristic of a mineral, and is the basis of all modern classifications of minerals. All of the known chemical elements have been found in minerals, and minerals are the only known source of many of them. On the other hand, a few elements, such as nitrogen, are rare in minerals. The ordinary methods of analytical chemistry are used to determine the chemical composition of minerals. E.S.

Consult Shinn's *The Story of the Mine;* Crosby's *Common Minerals and Rocks;* Dana's *Minerals and How to Study Them.*

Related Subjects. The reader who is interested in the subject of minerals and mineralogy will find much helpful information in the following articles in these volumes. Not all the minerals are listed here, but if the reader will consult such topics as GEOLOGY, CHEMISTRY and METALS he will find indexes which will supplement this one and bring the whole subject within the range of his reading.

Agate
Alabaster
Almandine
Amethyst
Aquamarine
Asbestos
Asphalt
Bauxite
Beryl
Bitumen
Brimstone
Calcite
Carbon
Carbuncle
Carnelian
Chalcedony
Chemistry (with list)
Chromite
Coal
Copper Glance
Corundum
Crystallization
Diamond
Emerald
Emery
Feldspar
Fluor Spar
Fulgurite
Garnet
Geology (with list)
Heliotrope
Hone
Iceland Spar
Jade
Jasper
Jet
Kyanite
Labradorite
Lapis Lazuli
Magnetite
Malachite
Metals (with list)
Mica
Mining
Onyx
Opal
Phosphorus
Plumbago
Pyrite
Pyroxene
Quartz
Ruby
Rutile
Salt
Sapphire
Sardonyx
Silica
Silicon
Steatite
Sulphur
Talc
Topaz
Tourmaline
Turquoise
Water

MINERAL WATERS, certain spring waters filled with various mineral substances, such as sulphur, lime, magnesia, silica, salt or iron, which have been dissolved by the carbonic acid or alkalies and collected as the water seeped through rocks to an outlet. Such springs have always attracted tourists, especially health-seekers, in great numbers, for their curative qualities are supposed to make them a remedy for many chronic ailments. Physicians attach little importance to them, however. There are over 10,000 mineral springs in North America, about 800 of which have more or less commercial, if not actual, curative value. Most of these are in the eastern part of the United States, especially New York and the Mississippi Valley, the best known being at Saratoga Springs, N. Y., Hot Springs, Va., and Hot Springs, Ark.

The famous springs at Saratoga, N. Y., are reputed to be helpful to those suffering from diseases of the liver, spleen and skin, and from neuralgia, rheumatism and dyspeptic troubles. At Hot Springs, Va., are the Berkeley Springs and White Sulphur Springs, the waters of the former being valued as a cure for dyspepsia and diseases of the liver and bowels, while those of the latter are used in the treatment of gout, rheumatism and similar ailments. The Hot Springs of Arkansas are among the most notable in the country; many people visit them hoping to be cured of diseases of the blood.

Travelers abroad often visit the famous springs at Aix-la-Chapelle in Prussia, Karlsbad in Bohemia, or Baden-Baden in Germany, while a number of foreign mineral waters are imported to the United States, such as Apollinaris from Germany, Hunyadi-János from Hungary and Vichy from France. Apollinaris is sometimes used to treat nervous irritation accompanied by dyspepsia, and is a well-known table beverage. Hunyadi-János is a standard relief for habitual constipation and for gouty disorders.

MINERAL WOOL, also known as MINERAL COTTON, is a substance used for packing around steam pipes to prevent the escape of heat, and for matting under floors to deaden sound.

It is prepared by forcing the molten slag of a blast furnace through a crescent-shaped opening by the pressure of steam. The slag cools in long, fibrous threads, which are pressed into mats. It is an excellent nonconductor of heat, and cannot be set on fire, hence it forms a valuable material for packing around any heated object. It is employed as a covering for steam boilers and pipes to prevent loss of heat, and also to protect water pipes from frost.

MINERVA, *mi nur' va,* in classic mythology, was the goddess of wisdom, science and the arts, known to the Greeks also as *Athene.* She is represented in legend as the daughter of Jupiter and Metis. Shortly before her birth her father swallowed her mother, and it came to pass that Minerva sprang full-grown from the head of Jupiter, clad in shining armor and singing a triumphant song of victory. Many attributes are ascribed to her by myth writers. As patroness of the arts and industries she supervised the building of the wooden horse which caused the fall of Troy (see TROY), and she directed the construction of the *Argo* (see ARGONAUTS).

From his awful head
Whom Jove brought forth, in warlike armor drest,
Golden, all radiant.
—SHELLEY.

She presided over agriculture and navigation, spinning, weaving and needlework, and though a warlike divinity, bestowed her favor only on those who practiced defensive warfare. Ulysses was her favorite warrior. It is told that Minerva invented the flute, and that she cast it aside because Cupid laughed at her puffed cheeks as she was playing. In the reign of Cecrops, first king of the Athenians, she contended with Neptune for the possession of their capital city. Neptune produced a horse as the most useful gift to mankind; Minerva brought forth the olive, and to her the gods awarded the city, which was named Athens, in honor of her Greek name, Athene. The olive tree was sacred to Minerva, and oxen and cows were offered as sacrifices to her. She is sometimes represented wearing a gilt helmet and carrying a shield, and sometimes she is clad in the garb of a Grecian matron. She was the only one of the gods to whom Jupiter ever entrusted his wonderful shield, the aegis, which bore in its center the head of Medusa.

Consult Gayley's *Classic Myths in English Litcrature and in Art.*

MIN'IMUM WAGE. When the Australian state of Victoria, in 1896, decided it unwise for a worker to be paid less money than he needs to keep himself and his family in good condition, and created boards with power to determine the least wage which employers in certain trades might pay, the step was considered a bold experiment. Agitation for similar legislation in other countries received encouragement from neither capitalists nor wage earners. Not for fourteen years was there any imitation of Victoria, but thereafter the principle of the minimum wage quickly spread. In 1910 boards were created in Great Britain, where it was found that in one industry about one-fourth of the employees received less than five and a half shillings (about $1.35) a week. The principle was adopted by Massachusetts in 1912, in 1913 by Wisconsin and seven Western states, in 1915 by Arkansas and Kansas and the republic of France. Other states have appointed commissions of investigation. The American laws apply only to women and children. Utah has fixed the amount of wages; some states give this power to boards, others merely give the boards power to recommend.

The theory of the minimum wage is that an industry which cannot afford to pay a "living wage" is a detriment rather than an asset to a community. Oregon, after a year under its law, determined by an investigation that it had not resulted in the displacement of women by men, that it had not tended to lower the wages of the better-paid women, and that it had increased the cost of commodities only three mills per dollar, that is, three-tenths of one per cent. Massachusetts and Washington have reached similar conclusions. It is generally conceded that the establishment of minimum wages increases efficiency and adds to cheerfulness and contentment.

MINING, a general term relating to the practice of working in the earth for valuable minerals of all kinds.

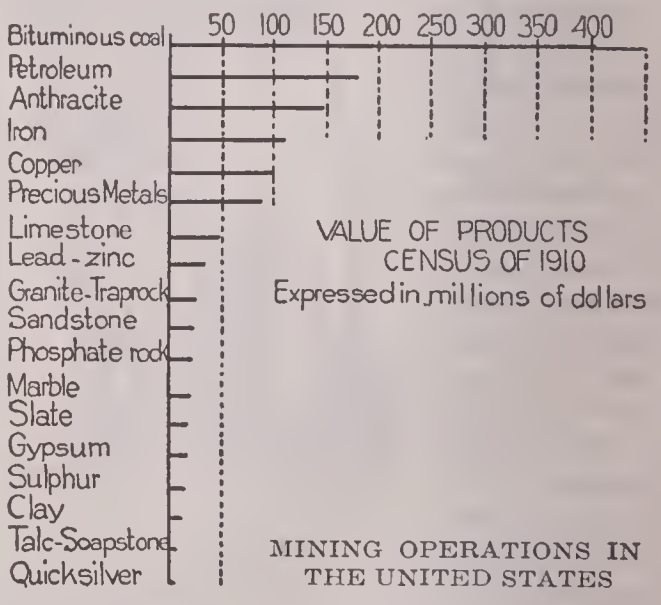
It has often been said that the history of mining is the history of civilization, and that by the progress of mining mankind measures its own advance. The earliest period of man's existence is the Stone Age, a term which suggests a brutelike creature with intelligence sufficient to overcome the wild beasts. Man lived like the beasts, but he knew enough to use rocks and stones as tools and weapons.

The Stone Age lasted for thousands, perhaps tens of thousands, of years. Then man found the first metals. Probably gold was the first to be discovered, for it is found in its pure state in many parts of the world, it is shiny and attracts the eye, and frequently lies on the surface. After gold came copper, and then tin, and when man learned to mix copper and tin to make bronze, the Bronze Age began. The stone users were no match for invaders armed with bronze weapons. So well did bronze serve man that for centuries he looked for nothing harder. When the Spanish adventurers invaded Mexico in the sixteenth century they found the Aztecs still using bronze weapons and implements of peace. With gold and silver they were familiar, but of iron they were totally ignorant.

Who first forged iron? The answer must always be a mystery. Pure iron is practically unknown on the earth except in the form of meteorites, and the earliest iron tools were probably made from these. Because iron ore bears no resemblance at all to the metal it contains, iron became known to man only at a comparatively recent time. Even had he learned of its existence, the difficulty of separating it from its rock matrix was very great. To this day, in remote parts of the world—in Africa, in the Malay Peninsula—the natives use primitive methods to obtain the iron; a simple hearth is operated by a pump or only blown by the winds, and the heated metal ball is beaten to drive out the impurities.

In the course of centuries the users of iron conquered the users of bronze, and the Iron Age began. In Africa, so far as present knowledge goes, the natives have always used iron. In ancient Greece iron was given as a prize in athletic games. The ancient peoples made deities of their smiths, Vulcan, Hephaestus and Thor, and the commonness of the name *Smith* in every language shows the importance of the occupation in later days. The present age uses iron in the form of steel, and it is not merely idle speculation to wonder if the twentieth century will not some day be known as the Steel Age.

The minerals for which men dig are not evenly distributed throughout the crust of the earth. Diamonds, for example, are comparatively rare, a fact which partly explains their great cost. Iron, copper and tin, though com-

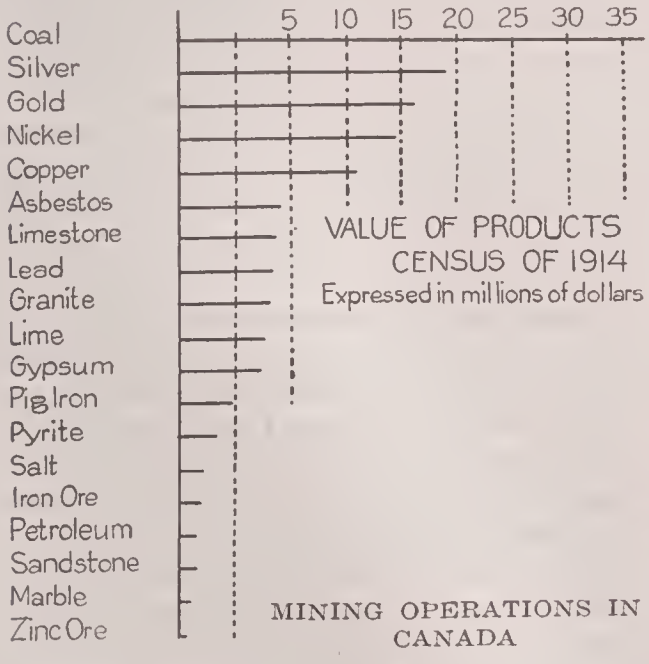


MINING OPERATIONS IN THE UNITED STATES

mon, are less abundant than coal, which is found under a great part of civilized America and Europe. How many people who enter a jeweler's shop consider the stories of the minerals which they see—stories full of romance, of toil, of hope, and sometimes of despair of enslaved natives. There is the gold of many countries, and the silver of Mexico, Nevada, Bolivia, Spain; there is tin from Cornwall and Malacca; copper from Lake Superior's shores,

and platinum from the Ural Mountains. Those glittering diamonds have come from Kimberley, or perhaps from Brazil; the rubies from Burma; the emeralds from Peru; the sapphires from Ceylon, and the turquoises from Persia. In your town there may be a foundry, which possibly receives iron mined in the British Isles, France, Germany, Austria, Russia, Sweden, Italy, Spain, Siberia, Canada or the United States. The grocery store has sulphur from Sicily or Louisiana, and salt from Austria, Great Britain, Michigan or New York, and the stonemason may have Italian marble side by side with Vermont granite and Welsh or Pennsylvania slate.

Back of the production of these minerals is the story of the pioneers. The search for minerals, especially the precious metals, is a record of romantic and thrilling episodes in the lives of individuals and of nations. In their day the Phoenicians went to the ends of the known world, to South Africa and to Spain, for gold, silver and copper. It was the wealth they won from the mines of Spain which later made the Carthaginians rich and powerful enough to defy the power of Rome. Spain became the Roman Siberia, where thousands upon thousands of slaves spent their lives in the mines for the glory and wealth of Rome. In more recent times the discovery of new mineral deposits has always been followed by quick colonization and slower civilization. The prospector, the gold seeker, has always pushed far ahead of organized society. It was the lure of



MINING OPERATIONS IN CANADA

precious metals and gems which led men to the four corners of the earth—to India, America, Africa and Australia. In Mexico, Peru, British Columbia, California, New South Wales, the Transvaal, Alaska, the Yukon and Porcupine —wherever yellow nuggets or traces of gold have been found towns have sprung up in a night, as if by the magic of Vulcan or Thor. Civilization treads on the heels of the gold-digging adventurer.

Prospecting. The discovery of deposits of valuable minerals calls for a great deal of knowledge and experience. The presence of iron is often suspected from the rusty appearance of rocks. Beds of magnetic iron are often discovered by the peculiar influence they exert on the magnetic needle. Reservoirs of petroleum are marked now and then by oily springs. But even when mineral deposits are known to be present in the soil, it is necessary to determine how extensive they are before money can be safely expended in mining operations. There are several ways of finding out just how rich the deposit is. Underground borings may be made here and there, following the mineral layer, or seam; or a number of holes may be driven from the surface of the ground, piercing the seam at intervals. If these explorations indicate a rich bed of ore, preparations for mining are made.

Kinds of Mines. The kind of mining to be followed depends in each case upon the nature and position of the deposit. Much ore is found spread under the earth in layers of varying thickness, level or with only a slight grade. On the other hand, ore is occasionally found in layers that are almost vertical, or it may occur in separate pockets. The depth at which it is found varies greatly. Some exceedingly deep mines, like the Calumet and Hecla copper mine, at Calumet, Mich., go down into the earth more than six times the height of the Woolworth building in New York, or nearly a mile. Deep mines of this sort often, indeed, somewhat roughly resemble the interior of a modern office building with its layers of floors. The hole, or shaft, cuts through a number of beds of mineral, all rich enough to be workable. In such a case, mining goes on simultaneously on several levels, precisely like the work in a factory, and the miners are lowered to their work in a cage which is quite like the elevator in a modern office building.

Not all mines, of course, are entered by means of vertical holes. Seams of coal often reach the surface, and nothing is commoner in the American Middle West than to see the mouths of mines, looking like rather dirty caves, leading directly into the sides of hills. A passer-by,

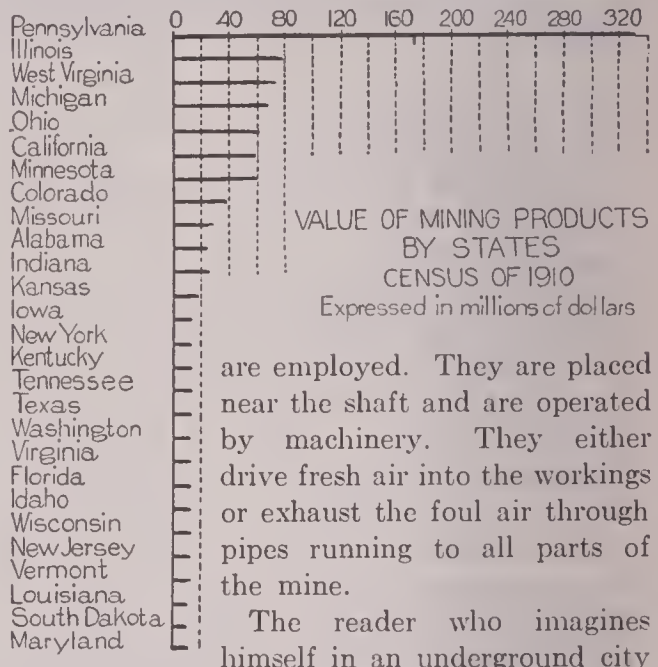
glancing into these black holes, may occasionally catch the gleam of a miner's lamp dancing far down like a will-o'-the-wisp.

When a shaft has been driven down to tap the bed, galleries are driven in all directions, following the seam. There are main tunnels and numerous branching tunnels, leading to the spot where the miners are at work. Certain great mountains in the West are simply honeycombed with such workings. Unless the mines are lighted by electricity, the men work, half-naked, in a world of blackness, except for the little islands of light cast by the pit-lamps they wear on their caps. Each man, so to speak, carries his own sun about with him, and this sun has to be carefully shielded with a gauze covering so that it will not ignite the gas and cause a shattering explosion.

Coal Mining. Coal mines being the most common, it is the work in coal mines that is described here. The miner descends into the pit by means of a cage lowered and raised on a wire rope, wound upon a drum. He follows the main tunnel, in which a track for the running of small trucks is laid, to the branching gallery that is nearest his work. Once at the working face, he sets about the day's work with drill, pick and shovel. With the pick and shovel, or with a modern machine, called an *undercutter,* he undermines a ledge of coal. Above he makes numerous small holes with the drill and inserts charges of black powder in the glistening black surface. The blast is set off and the coal is shattered and falls to the floor. The miner's task is then to sort it and load it into small trucks, which are later hauled to the mouth of the pit, either by mules or at the end of a cable such as is used in pulling cable cars through the streets of a city. In some mines, where the seam is shallow, blasting cannot be done to advantage, and the coal has to be brought down by hand.

Accidents. One of the terrors often present to the mind of the worker underground is the fear that the roof will fall on him. In spite of all the precautions that are now taken, such accidents claim more victims than any other sort. More than 1,000 miners lost their lives from caving roofs in 1913, out of a total death-list of 2,785. To prevent this, the crushing weight of rock and soil above has to be firmly supported, either by stout pillars of coal left standing here and there, or by timbers anchored against ceiling and floor. These props, or struts, are left standing in the active workings, but when parts of a mine are abandoned, it is usually thought best to remove the timbers and allow the roof to cave in.

Another danger which menaces the underground worker is that of gas. Coal gives off a gas that is easily ignited and gives rise to terrific explosions (see FIRE DAMP). In order to free mines from such impure air, rotary fans



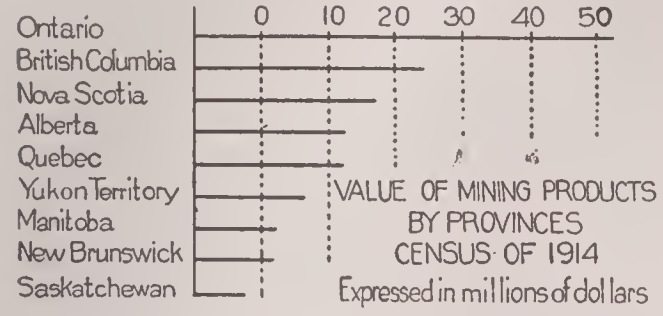
are employed. They are placed near the shaft and are operated by machinery. They either drive fresh air into the workings or exhaust the foul air through pipes running to all parts of the mine.

The reader who imagines himself in an underground city with an orderly arrangement of streets and alleys—a wide main street with a number of narrower streets and still narrower alleys all leading to it—will have a fair idea of the average coal mine. The traffic conditions in the mine, however, are sometimes better than those of even large cities. Tracks are laid on all the chief avenues, as well as in many of the alleys, and issue ultimately upon the main street. Down these tracks the coal is hauled in trucks, which are linked together so as to form a train on the main track.

The trucks are hoisted up the shaft to a lofty wooden structure called the tipple, where the coal is weighed, sorted by being passed through screens of varying size and dumped into coal cars underneath.

Importance of Industry. In the mines and quarries of the United States over a million workers gain their livelihood. The capital invested was, according to the latest Federal census, $3,380,525,841, and the value of the product, $1,238,410,322. The most extensive operations are conducted in the Middle Atlantic states, where the industry amounts to almost thirty per cent of the whole. Pennsylvania is the leading state in the Union, the second being Illinois. The greatest value—$401,577,477—was the product of the mines putting bituminous, or soft, coal on the market; the value of

the anthracite, or hard coal, was $149,180,471. The iron mined was valued at $106,947,082, and the precious metals (gold and silver) at $94,-



123,180. In Canada the annual mineral production, in which coal leads, averages $120,000,000 to $140,000,000.

Consult Hoover's *Principles of Mining;* Kemp's *The Ore Deposits of the United States and Canada.*

Related Subjects. In the articles on the various countries, states and provinces there are subheads on mining or minerals which contain much statistical matter, and in the articles on most of the important minerals there is a discussion of the methods of mining (see, for example, COAL, subtitle *Coal Mining*). The reader is also referred to the following more general articles:

Assaying
Bronze Age
Fire Damp
Flux
Gems
Geology
Iron Age
Metals (with list)
Minerals and Mineralogy (with list)
Stone Age

MINISTERS, FOREIGN. See DIPLOMACY.

MINISTRY, *min'is tri,* a body of executive officers, heads of administrative departments of a government, who act in an advisory capacity to the head of the state, or direct the affairs of the nation. The term relates directly to the Cabinet as organized in Great Britain, the Dominion of Canada and the Commonwealth of Australia. While the United States adopted many of its fundamental principles of government from the British Constitution, including a modified form of the Ministry, no name for the body was authorized by the Federal Constitution, and, indeed, the American Cabinet as to-day constituted was not at first contemplated (see CABINET).

The English Ministry may contain as few as eleven members, or as many as nineteen, in ordinary times. During the War of the Nations other Ministerial posts were created, such as Minister of Munitions. The Ministry has for its head the Prime Minister, or Premier, appointed by the sovereign, and he serves until the country, in a general election, votes a lack of confidence in the policies he advocates. The entire Ministry then resigns, whereupon the ruler seeks another statesman more in harmony with the temper of the country, and he is invited to form a new Ministry. Each member of the English Ministry must be a member of the House of Commons; likewise, in the Dominion of Canada and in Australia, the Premier cannot appoint a Minister who has not secured election to the Parliament of the Dominion or Commonwealth.

The Ministers forming the Cabinets of England and Canada in ordinary times are the following:

England

Prime Minister and First Lord of the Treasury
Lord President of the Council
Lord High Chancellor
Secretary of State for Foreign Affairs
Secretary of State for India and Lord Privy Seal
Secretary of State for the Home Department
Secretary of State for the Colonies
Secretary of State for War
Chancellor of the Exchequer
First Lord of the Admiralty
Chief Secretary to the Lord-Lieutenant of Ireland
President of the Board of Trade
President of the Local Government Board
President of the Board of Education
Secretary for Scotland
President of the Board of Agriculture and Fisheries
Postmaster-General
Chancellor of the Duchy of Lancaster
First Commissioner of Works

Canada

Prime Minister
Minister of Trade and Commerce
Secretary of State
Minister of Justice and Attorney-General
Minister of Marine and Fisheries
Minister of Militia and Defense
Postmaster-General
Minister of Agriculture
Minister of Public Works
Minister of Finance
Minister of Railways and Canals
Minister of the Interior and Superintendent of Indian Affairs
Minister of Customs
Minister of Mines
Minister of Labor
Minister of Inland Revenue
Minister of the Naval Service
Ministers without Portfolio

MINK, a small, active, fur-bearing animal of the weasel family, inheriting the family characteristics of swiftness and agility. Equally at home on land or in water, the mink is never without a habitation. It is about two feet long, web-footed, has a bushy tail that is one-fourth of the length of the animal and a coat varying in color from light brown or tan to a dark chocolate. It lives in all parts of North America, in Europe and in Northern Asia.

The mink of Northern regions is very valuable because of its fur, which has withstood the changeable dictates of fashion; beautiful and durable, it makes desirable apparel when converted into coats, hats, muffs, etc., and it is not imitated in inferior furs. The mink of Nova Scotia and that of the state of Maine produce the finest and glossiest fur. The darker specimens bring the highest prices; a muff of good quality costs $100 or more. The pelt must be secured early in the winter, before the playful little animal injures it by scrambling through holes and broken ice.

Minks have a fondness for the water courses, where food, consisting of frogs, fishes, etc., is plentiful, but mammals are not safe from their attacks when they wish to satisfy their hunger. The young, not more than four or five, are born in the spring in some hole among the rocks or in a hollow log, where they remain until winter. The mink has a strong, disagreeable odor, not so pronounced, however, as that of the skunk and rarely perceptible; at least it is not offensive to most people, except when the animal is in a rage. See FUR AND FUR TRADE; ANIMAL.

MINNEAPOLIS, *min e ap' o lis,* MINN., the county seat of Hennepin County, is the largest city in the state; the population in 1910 was 301,408; in 1915 it was 343,466. It is in the southeastern part of Minnesota, and is situated on both banks of the Mississippi River, 167 miles south and west of Duluth and 424 miles northwest of Chicago. Saint Paul, the state capital, situated on a northward bend of the river, is ten miles east of Minneapolis, and the two places, known as the "Twin Cities," have continuous suburbs and are connected by several interurban electric lines.

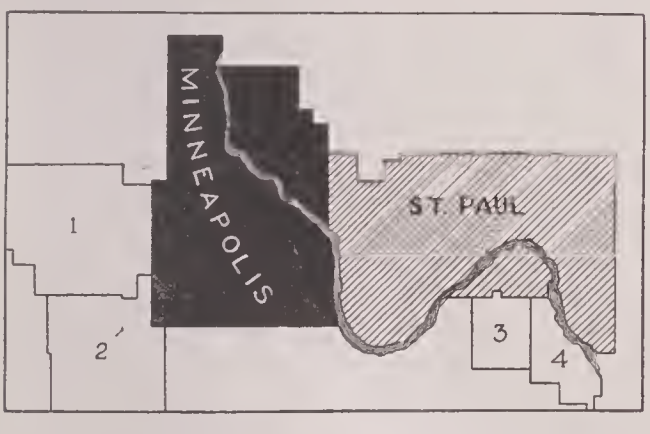
Three principal factors have contributed to the growth and development of Minneapolis as one of the great commercial centers of the northwest; these are Saint Anthony's Falls, which generate power for factories, a location near extensive grain fields and forests, and excellent shipping facilities. An enormous apron and concrete floor were built in the river in 1879 to prevent the threatened destruction of the falls by the wearing away of the original limestone ledge. A system of locks and dams, whose construction was begun in 1915, increases the work of the falls 40,000 horse power and makes the river navigable to the city. Railroad systems entering the city are the Chicago, Milwaukee & Saint Paul; Northern Pacific; Great Northern; Minneapolis, Saint Paul & Sault Ste. Marie; Chicago, Saint Paul, Minneapolis & Omaha; Chicago Great Western; Chicago, Rock Island & Pacific; Minneapolis & Saint Louis, and the Burlington Route. Five roads enter the Great Northern passenger station, or Union Depot; three enter the Chicago, Milwaukee & Saint Paul passenger station, and the Minneapolis & Saint Louis Railroad has its own station. Nearly twenty railway and highway bridges cross the river within the city limits.

The word *Minneapolis* combines the Indian word *minne,* meaning water, and the Greek word *polis,* meaning city. The extent of the city from north to south is ten miles, and from east to west, six miles; the estimated area is fifty-three square miles. The West Division, much the larger part of the city, is divided by the river from the East Division. The great mills of Minneapolis are grouped along the river near Saint Anthony's Falls. The principal business streets are Hennepin Avenue, Nicollet Avenue and First and Second avenues; many of the handsomest residences are along South Mount Curve and Clifton and Park avenues, in the southwest part of the city. All the streets are wide and, with the exception of a portion of the business district, run due east and west, north and south.

Parks and Boulevards. In developing a system of parks, Minneapolis has taken advantage of the unusual opportunities offered by a num-

ber of natural lakes and the banks of the Mississippi. All of the parks, with a total area of 3,800 acres, are connected and intersected by boulevards fifty miles in extent. From Loring Park, near the center of population, Kenwood Parkway extends to a group of lakes, Cedar Lake, Lake of the Isles, Lake Calhoun and Lake Harriet, in the southwestern part of the city. Waterways for small craft, canoes, launches and sail boats connect these lakes, whose surrounding grounds (with the exception of Cedar Lake) form one large, continuous park. From Lake Harriet, the southmost of the group, the parkway extends southeast along Minnehaha Creek to Minnehaha Falls, a veil of water fifty feet high. The name *Minnehaha* has been immortalized in Longfellow's poem, *Hiawatha*. Here is a park of 142 acres, adjoining the grounds of the Minnesota State Soldiers' Home. Fort Snelling, a military reservation, the refuge of settlers in Indian war days, is south of Minnehaha Park. From this point a parkway extends north along each side of the river, on the west side to Riverside Park, one mile south of Saint Anthony's Falls, and on the east side to the state university campus. Throughout the city are a number of small parks. A short distance west of Minneapolis, reached by three railway lines, is an irregularly-outlined body of water, Lake Minnetonka, a delightful summer resort.

Public Buildings. One of the most conspicuous of the many handsome public buildings in



METROPOLITAN DISTRICT

(1) Saint Louis Park, village
(2) Edina, village
(3) West Saint Paul, city
(4) South Saint Paul, city

Minneapolis is the county courthouse and city hall, a large granite structure covering an entire block. It was erected by the county and city together, at a cost of $3,500,000. From its main tower, 345 feet high, may be had an excellent view of the city. Among other noteworthy structures are the new Federal building, which also covers an entire block, the Auditorium armory, the public library and branch buildings, Y. M. C. A. and Y. W. C. A. buildings, the Minneapolis Institute of Art, Corn Exchange, Lumber Exchange, the Great Northern depot and the Central high school. The prominent bank buildings include those of the Andrus, McKnight, Plymouth, Palace, Security and Soo First National banks; among the leading hotel buildings are the Radisson, Nicollet, Dyckman, Plaza and West; the Auditorium and Metropolitan are prominent theaters. Noteworthy churches are the Cathedral of Saint Mary, the First Baptist, the Wesley and the Fowler Methodist Episcopal, the Westminster Presbyterian, Plymouth Congregational and First Unitarian.

Institutions. The University of Minnesota (which see) occupies a beautiful campus on the east river bank. Institutions of collegiate rank in the city and vicinity are Augsburg Seminary (Lutheran), Minnesota College (Swedish), Hamline University (Methodist Episcopal) at Hamline, between Saint Paul and Minneapolis, and Macalister College (Presbyterian), at Macalister, a suburb between the two cities. Private schools include Stanley Hall, Graham Hall and Saint Margaret's Academy, girls' schools; and Blake School and De La Salle Institute, schools for boys. Dunwoody Institute, an institution maintained in part by the city, is a vocational school for boys.

Minneapolis has become widely known as an art center. The Minneapolis Symphony Orchestra, an organization including nearly 100 artists, is considered one of the leading institutions of its kind. In addition to the regular winter concerts in the city, given upon occasion in conjunction with the Philharmonic Club, a large choral society, the orchestra makes concert tours in the United States and Canada. The Art Institute building is one of the city's most distinguished structures. In it are permanent galleries and space for traveling exhibitions and the schoolrooms of the Minneapolis School of Arts. There are many private music and art schools, among them the Johnson School of Music, the Northwestern Conservatory of Music and the Handicraft Guild.

Among the leading hospitals are the Minneapolis City Hospital, Asbury Methodist, Northwestern, Saint Mary's and Saint Barnabas hospitals. In the city are a number of sanatoriums. The charities include the Catholic Orphans' Home; Washburn Home; Pillsbury House and

other settlement houses, and a number of free dispensaries.

Industries. Minneapolis, called the "Flour City," leads the world in the manufacture of flour. The great mills, among them the largest single mill in the world, are grouped about the Falls of Saint Anthony, most of them on the west side of the river, within six blocks of the business center. The power of the falls, increased by successive dams across the river, the development of the extensive wheat fields of the northwest and the enterprise of the early millers secured for Minneapolis this great industry. The daily capacity of the mills is about 85,000 barrels, and the value of the annual output exceeds $90,000,000. Minneapolis is also the greatest single wheat market of the world. There are about fifty enormous grain elevators, with a combined storage capacity of 45,000,000 bushels.

With the gradual exhaustion of the pine forests of the north-central states the lumber industry is slightly decreasing, although the city is still one of the greatest lumber distributing points in the world. The great logs from the forests are floated down the Mississippi River and stopped by the booms near the mills. Cooperage, the manufacture of lumber products, furniture, interior finishings, the manufacture of breakfast foods, agricultural implements, boots and shoes, clothing, underwear, iron and steel products, linseed oil, paper, etc., are other extensive enterprises whose annual product, together with the output of flour and lumber, is worth more than $165,000,000. The wholesale houses of Minneapolis supply a vast outlying territory.

History. In 1660 the Falls of Saint Anthony were discovered and named by a Jesuit missionary, Father Hennepin (see HENNEPIN, LOUIS). In 1766 the place was visited by Jonathan Carver, who wrote in glowing terms of its natural beauty and commercial possibilities. By a treaty made between Lieutenant Zebulon Pike and the Sioux Indians, in 1807, the United States came into possession of a short strip of land along both banks of the river, which included Saint Anthony's Falls and the site of Minneapolis. Fort Snelling was built in 1819 by Colonel Leavenworth, under government commission, and in 1823 a mill was erected to furnish the fort with lumber and flour. Saint Anthony, a village on the east side of the river, settled in 1837, was platted and the first commercial sawmill built in 1848. A second settlement, begun in 1850 on the west side of the river, soon outgrew Saint Anthony and was incorporated as a town in 1856 and became the city of Minneapolis in 1867. Saint Anthony was annexed in 1872. In 1892 the Republican national convention met in the city. C.T.

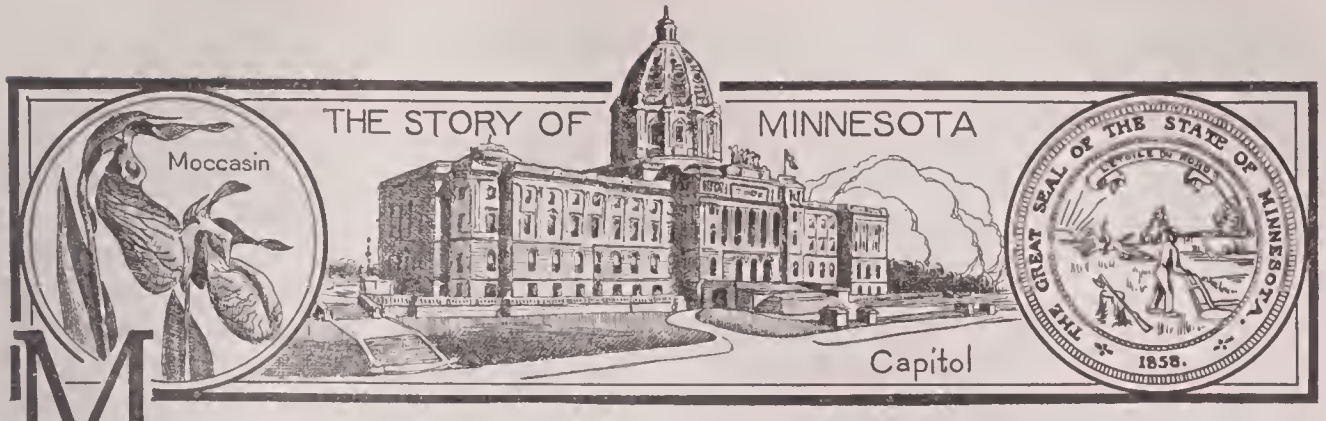
Consult Parsons' *The Story of Minneapolis:* Hudson's *A Half-Century of Minneapolis.*

MINNEDOSA, *min e do'sah,* a town in southwestern Manitoba, the chief town of the northern judicial district. It is on the Little Saskatchewan River, which is not navigable, and on the Canadian Pacific Railway, on which it is a divisional point. It is 134 miles west of Winnipeg, seventy-nine miles west of Portage la Prairie and fifty-one miles north of Brandon by rail. Founded in 1883 by Edwin Oliver Denison (died 1915), it has gradually grown to importance, and is now an important distributing center. It has a number of large grain elevators, several lumber mills and other industrial plants, including the railway shops and the hydroelectric power plant. The armory, erected in 1912, the post office and customs-house, completed in the following year, and the courthouse are the most conspicuous structures. Population in 1911 was 1,483; in 1916, 1,831. G.T.T.

MINNESINGERS, *min'e sing erz,* the wandering minstrels of Germany in the twelfth and the thirteenth centuries. Highborn and courtly, as well as delightful entertainers, they were royally welcomed at the feudal castles to which their travels brought them. They wrote both poems and music, their lyrics relating chiefly to sentimental subjects. This gave rise to the name *minnesinger,* for *minne* is the Old German word for *love.* Many of their compositions, however, concerned religion, nature, patriotism, the Crusades and the political questions of the day.

One of the most brilliant of the minnesingers, Walther von der Vogelweide, was considered to have helped so greatly to awaken the German national spirit that the emperor rewarded him with a private estate. Longfellow wrote an interesting poem entitled *Walther von der Vogelweide,* and Wagner's opera of *Tannhäuser* is based in part upon an ancient legend about this beloved poet of early days. Wolfram von Eschenbach, another celebrated minnesinger, was the author of an epic called *Parzival,* the inspiration of Wagner's famous music-drama *Parsifal* (which see).

After 1300 the art of the minnesingers languished, but its revival was attempted by the mastersingers. See MASTERSINGERS.



MINNESOTA, a great state in the north-central part of the American Union, tenth in size among the states. Its name, a Sioux Indian word, is poetic; it means *sky-tinted water*, or *cloudy water*. It is nicknamed THE GOPHER STATE from the little burrowing animal found there; but its more popular names are the BREAD AND BUTTER STATE, in reference to its wheat and its dairy products, and the NORTH STAR STATE, from its motto, the "Star of the North." As the state flower the moccasin flower, or lady's slipper, has been selected, a curious orchid which grows in the moist land about the many lakes.

Location and Size. The state lies just about at the geographical center of North America. To the north are the Canadian provinces of Manitoba and Ontario, to the east Lake Superior and Wisconsin, to the south is Iowa and to the west are North and South Dakota. Its boundary line is very irregular; on the west the Red River of the North makes up a large part of it; on the north is a chain of lakes and rivers, including Lake of the Woods, Rainy River, Rainy Lake and Pigeon River, and on the east Lake Superior and the Saint Croix and Mississippi rivers separate it from Wisconsin through almost its whole length. Although a great inland state, two-thirds of its boundary is water.

Minnesota has its greatest length from north to south, almost 400 miles, and an extreme breadth in its northern portion of 380 miles. Its total area is 84,642 square miles, Nevada and Idaho being the states nearest in size; but it differs from them in having a water surface of almost 3,500 square miles, consisting of about 7,000 small lakes varying from one mile to thirty miles in length. It is about one-third the size of the province of Manitoba, to the north.

The People. The state had, in 1910, a population of 2,075,708, slightly less than that of the city of Chicago. In number of inhabitants it ranks nineteenth among the states, but in its density of population, 25.7 to the square mile, twenty-eight states surpass it. As it is chiefly a farming state, more than half of the population live under rural conditions, only about forty per cent living in towns of 2,500 or more. Indeed, large cities are few, for in addition to Minneapolis, the largest city, and Saint Paul, the capital, only seven cities have a population that exceeds 10,000. These, in the order of their size, are Duluth, Winona, Hibbing, Virginia, Saint Cloud, Mankato and Stillwater. Each is treated in a separate article in these volumes.

OUTLINE MAP OF MINNESOTA

Showing boundaries, navigable rivers, principal cities, mineral deposits, largest lakes and the highest point of land in the state.

According to latest estimates there are a number of other cities approaching the 10,000 mark.

Minnesota has been one of the great immigrant states, and less than one-third of the inhabitants are native-born and of native parentage. Of the foreign-born whites, over forty per cent are Scandinavians, Swedes predominating slightly over Norwegians, and about

twenty-five per cent are Germans. No other state so far east has as many Indians as has Minnesota, for living on its reservations, which are chiefly in the northern part, are no fewer than 9,050.

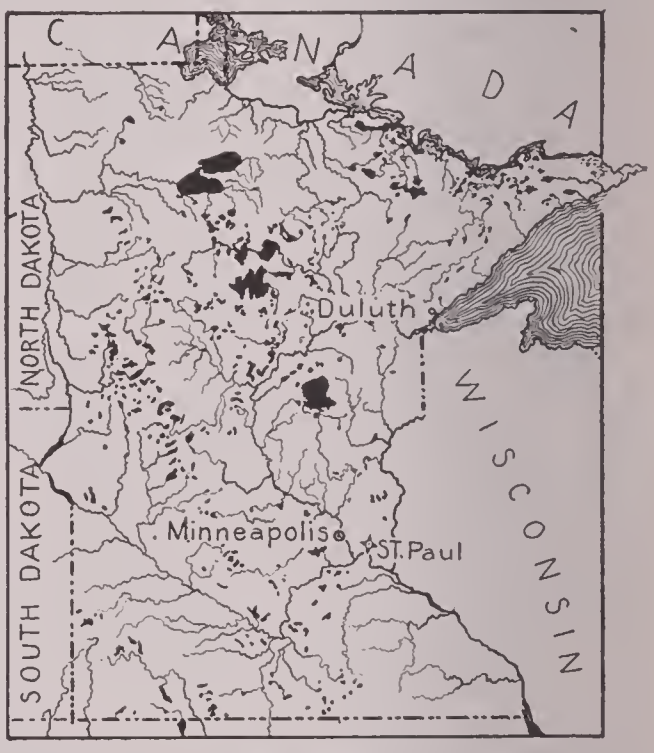
Surface Features. The most pronounced surface feature of this state, which has no towering mountains and no deep valleys, is the "height of land," as it is called, in the north-central part. Its very highest summit, in the Mesaba range, is but 2,400 feet above sea level, but no "great divide" in the world forms the watershed for greater rivers; for in addition to the Red River and the streams that feed the Saint Lawrence, there flows from its slopes the Mississippi, which, with the Missouri, is the longest system in the world. Not far from this highest land in the state is the lowest land, the coastal region about Lake Superior, which has an elevation of only 600 feet above sea level.

South and west, stretching across the state to the valley of the Red River, are rolling prairies, but these differ in some ways from the prairies of Illinois or of Kansas, for instance. Here and there they are interspersed with groves of hardwood trees, and in the southwest they are broken by the rounded hills which Longfellow in his *Hiawatha* calls "mountains of the prairie."

Waters. The greatest river system is that of the Mississippi, the "Father of Waters," which, with its tributaries, the Minnesota, the Saint Croix and various smaller streams, drains over half of the state, carrying the waters from this northerly region south to the Gulf of Mexico. The northwestern part of the state is drained by the Red River of the North and its tributaries, while the northeastern portion sends its waters through numerous short streams into Rainy River, or through the Saint Louis River into Lake Superior, and so on to the Saint Lawrence.

A glance at a map of Minnesota shows one striking peculiarity—its vast number of lakes. For the most part these are the result of the action of glaciers which long ago covered most of the northern part of the United States (see GLACIAL PERIOD); but some, as Traverse Lake, Big Stone Lake, Rainy Lake and Lake Pepin, are but widenings of river courses. In the north many of the lakes are deep, with rugged, rocky shores, but most of the southern lakes are comparatively broad and shallow. Whether in the north or in the south, however, many of the lakes are very beautiful, with their timbered shores and their clear, "sky-tinted" waters. The most famous of all is Lake Minnetonka, not far from Minneapolis, but the largest is Red Lake, in the northern part, which has an area of 340 square miles. Once upon a time there existed in the valley of the Red River a huge lake which at first drained southward toward the Gulf of Mexico and later northward into Hudson Bay, and it is the bottom of this old Lake Agassiz, as it is called, which constitutes the most fertile land in the state and which contain many of the smaller lakes of the present day.

Climate. The great advantage of the climate of Minnesota is the clear, dry air which makes endurable the extremes of temperature. The comparatively short summers often have very



A FEW OF MINNESOTA'S LAKES

hot days, and the long winters not infrequently show a temperature of thirty degrees below zero. It is not, however, mere local pride on the part of the people which makes them declare that the heat and cold are not felt as they are in regions of greater humidity. In fact, the climate on the whole is so healthful and so bracing that Minnesota is one of the favorite resort states in the Union.

Everywhere there is enough rain for successful agriculture, for while the average rainfall is but twenty inches in the northwest and thirty in the southeast, most of it occurs in the season when it is most needed. The northern part of the state has usually a sufficient snowfall to cover that section with snow during the greater part of the winter, and tobogganing is a favorite sport.

Resources and Industries

Minerals. Minnesota has entirely within its borders the most valuable iron ore region, so far as known, in the world. This is the Mesaba Range, in Saint Louis County, which seems to contain an almost unlimited store of this most useful of the metals, and has been known to produce in a year the vast total of 38,000,000 tons. The Vermilion Range, near by, is also rich in iron ore, and the Cuyuna Range further southwest has been developed more recently. In all, Minnesota produces about two-thirds of the iron output of the country. Most fortunate is the location of these valuable mines, for they are not far from Lake Superior, and their yield is easily transported by water to the various Great Lake ports. Much of the growth of Duluth has been due to its iron-shipping industries.

All the other mine products of Minnesota amount in annual value to only a small fraction, sometimes only about one-sixteenth, of the iron yield. The most important of them are clays and building stones; among the latter, granites, sandstones and limestones are produced in considerable quantities. In the southwestern part of the state, in Pipestone County, there is a deposit of stone which is of peculiar interest. It is a red pipestone, found nowhere else in the United States in any quantities; and from it the Indians of these western regions for many centuries made their calumets (which see), or ceremonial pipes, which were smoked to ratify any important agreement.

Forests. Originally Minnesota was one of the most heavily-wooded of the states, and today, despite long-continued cutting, the forest area is still large. In the highland region of the north the evergreen forests are still almost as dense as in the olden days, and Minnesota produces more white-pine lumber than any other state; but the "Big Woods" of the Sioux Indians, that extensive forest of maples, oaks and other hardwood trees which stretched almost across the state just north of the center, has been very much thinned out. No other state makes so many laths as Minnesota, and among the manufactured articles the lumber and timber products rank second in importance.

There have been, at various times, disastrous forest fires which have swept great regions, and the loss to the state has been shown in the decreased output of lumber. In order to prevent such catastrophes as far as possible, strict forestry laws have been passed and the office of state forester has been created, but that these measures have not been entirely effective may be seen from the fact that there were in 1910 over 900 forest fires which swept over more than 1,000,000 acres of wooded land. Within recent years, however, these forest fires have been very greatly reduced.

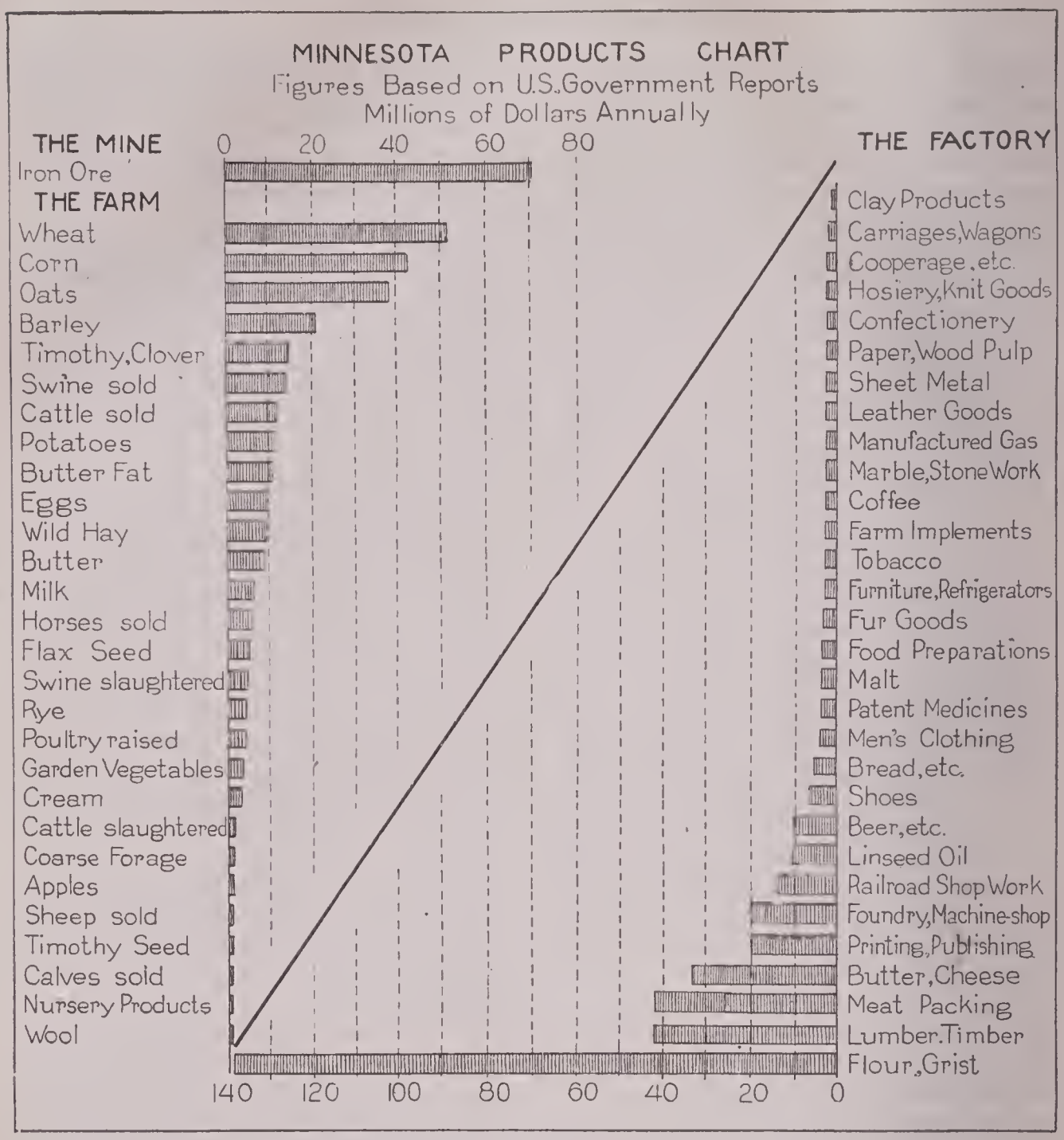
Agriculture. This is the chief occupation of the people, and over fifty-three per cent of the land of the state is in farms. For the most part these are of considerable size, the average being 177 acres. It is an interesting fact that, according to the census of 1910, the foreign-born farmers outnumber the native-born by about 7,000.

The chief crops are the cereals, among which wheat ordinarily holds the first place both in acreage and value. Minnesota ranks second to North Dakota in the production of spring wheat. Oats and corn are of increasing importance, while in the production of barley Minnesota surpasses all the other states. The hay and forage crops make up about one-eighth of the total crop value, and potatoes and flaxseed are of considerable importance. Apples are grown successfully in the southern part of the state, and strawberries and raspberries are raised in large quantities in the neighborhood of Minneapolis and Saint Paul.

Though not one of the foremost live-stock states, Minnesota has a large number of cattle, and its dairy industries are of rapidly-increasing importance, amounting in a year to almost $40,000,000.

Game and Fish. Minnesota, once a paradise for the huntsman and the angler, is still the home of great numbers of prairie chickens, partridges and quails, and is visited by flocks of ducks, teal, geese and brants during their autumn journey southward from Canada. In the forest regions the deer, elk and moose are still found, and pelicans, gulls and other fish-catching birds seek a place of refuge in the islets of numerous lakes. Game is protected in the state by stringent laws, administered by the Game and Fish Commission. Perch, pike, bass, whitefish, sturgeon and lake trout are important game fish; the fisheries are replenished from the State Fish Hatchery at Saint Paul and the United States Hatchery at Duluth.

Manufacturing. The manufactures of the state depend almost entirely upon its own raw materials, and not, as in the case of Massachusetts, for instance, upon imported raw materials. A considerable proportion of iron ore is

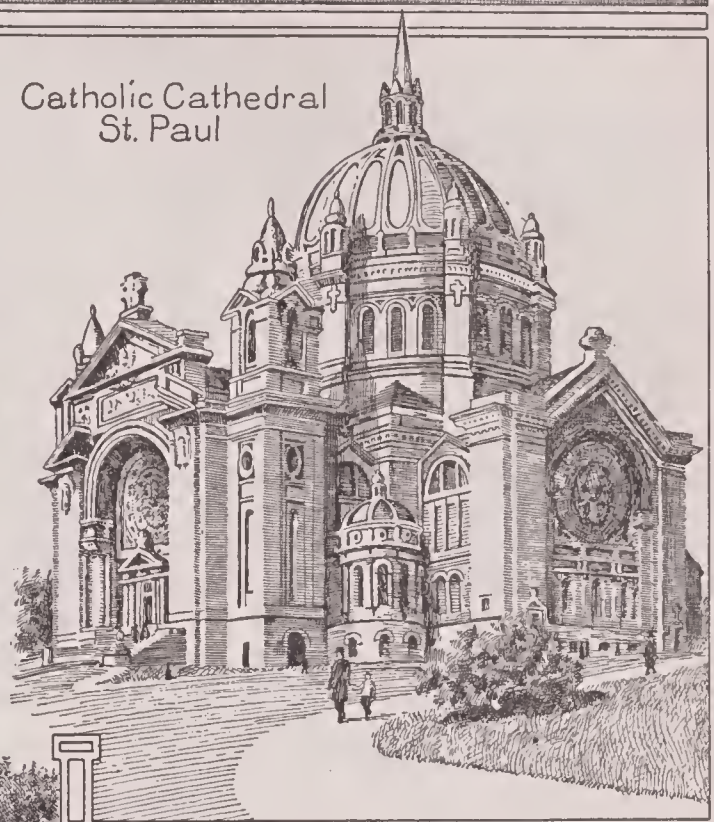


shipped in its original condition to Eastern markets, but great quantities are used in the ten-million-dollar plant which the United States Steel Corporation has erected at Duluth. There are, besides, vast wheat fields, millions of acres in extent, and thousands of miles of forest to provide material for local manufacture. No other state compares with Minnesota in the value of flour mill and gristmill products, over one-fifth of the flour produced in the United States coming from this one state. Minneapolis leads the world in its output of flour, the Falls of Saint Anthony furnishing it with an abundance of water power; but the industry is by no means confined to that city or to any one section of the state.

Second in value are the timber products (see *Forests*, above), and below these in value, but still of considerable importance, are the dairy products, the slaughtering and meat packing, foundry and machine-shop products, linseed oil and malt liquors. With a total value of manufactured products of almost $410,000,000, Minnesota ranks thirteenth among the states.

Transportation. Of water routes the state has an abundance. The Mississippi was very important in the early days of the state's history, but with the growth of railways its importance has declined. Not so with the Great Lakes, however, on which traffic from Minnesota grows heavier from year to year. Duluth, a small town but a few decades ago, is to-day

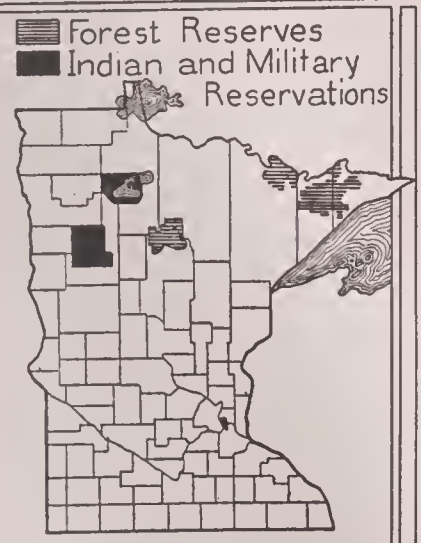
MINNESOTA

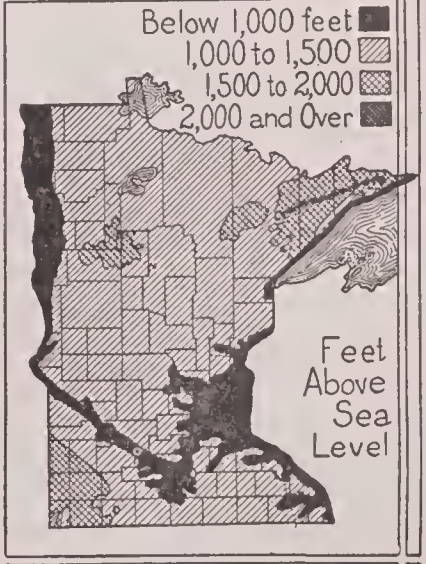

Catholic Cathedral
St. Paul

Beginning of the Mississippi River

People per square mile
by decades

1850	.07
1860	2.
1870	5.2
1880	9.7
1890	16.2
1900	21.7
1910	25.7





the greatest port on the Great Lakes, rated by tonnage, and is one of the chief ports of the country; Two Harbors also has rapidly-growing shipping interests.

Save in the northern part of the state, where large regions are very thinly settled, railway facilities are good, and Minneapolis and Saint Paul, taken together, constitute the chief railroad center of the Northern Mississippi Valley. The aggregate mileage within the state is slightly more than 9,000, the Great Northern, the Chicago, Milwaukee & Saint Paul, the Northern Pacific and the Chicago & North Western possessing the largest part of that total.

Social and Political Conditions

Education. Like most of the other central states, Minnesota has taken a deep interest in education, and its system is in many ways particularly effective. The percentage of illiteracy is low, only three per cent of the people being unable to read and write; and were it not for the large proportion of rapidly-arriving foreign-born inhabitants the number would be far less, there being less than one-half of one per cent of the native-born whites who cannot read and write. The amount spent each year on education amounted in 1914 to $19,396,782. The permanent school fund, over $24,000,000, is the largest in the country and is steadily growing because of the tax on iron tonnage.

Minnesota's compulsory education law has features which distinguish it from the laws of most other states, for the upper age limit is not fourteen years of age, as is usual, but eighteen. At the head of the school system is a state superintendent of education; under him are county superintendents. There is also a state high school board which appoints school inspectors. To encourage high schools in giving industrial courses, the state makes generous annual grants to such as teach agriculture, manual training, home training and like practical subjects, and there are also special vocation schools. Special aid is also provided for normal and business training. There are five normal schools, at Winona, Mankato, Saint Cloud, Moorhead and Duluth, and they are well attended, for there is a state law which forbids any teacher to enter upon the profession without special normal training.

Highest of the institutions of learning is the University of Minnesota, at Minneapolis, one of the foremost universities of the country, and the largest in point of student enrolment. Other important institutions, most of them denominational, are Hamline University at Saint Paul, Gustavus Adolphus College at Saint Peter, Saint Olaf College and Carleton College at Northfield, Macalester College at Saint Paul, Saint John's University at Collegeville, and Saint Thomas College at Saint Paul. The last two, both Roman Catholic schools, admit no women. Several schools and colleges of a denominational character, for women only, are located in various parts of the state, and there are also a number of theological seminaries.

Religion. Owing to the large proportion of Scandinavians and Germans in the population, the Lutheran Church is especially strong, no other Protestant denomination having one-fifth as many members. The Roman Catholics, however, are even more numerous than the Lutherans, comprising more than two-fifths of the total church membership. Of the other sects the strongest are the Methodists, Presbyterians, Baptists and Congregationalists, in the order named.

Charities and Punishments. All the charitable and penal institutions have been, since 1901, under the supervision of a state board of control, which consists of three salaried members appointed by the governor every six years. The charitable institutions under the charge of this board include five hospitals for the insane, at Anoka, Hastings, Rochester, Fergus Falls and Saint Peter; the state public school for dependent and neglected children, at Owatonna; a tuberculosis sanatorium, at Walker; a hospital for crippled and deformed children, at Saint Paul, and schools for the blind, the deaf and the feeble-minded, all at Faribault. In 1912 there was established near Willmar a state hospital farm, where inebriates and drug victims are helped to free themselves from their habits.

In its penal institutions Minnesota has introduced some of the most advanced ideas. There is a state board of parole, and the indeterminate sentence is in operation for all crimes except murder and treason. Since 1911 capital punishment for murder has been forbidden by law, life imprisonment being substituted. The penal institutions include the penitentiary at Stillwater, housed in a modern building completed in 1914; a reformatory at Saint Cloud; an industrial school for boys at Red Wing and a home school for girls at Sauk Center. Until 1895 the convicts in the state prison were leased

RESEARCH QUESTIONS ON MINNESOTA

(An Outline suitable for Minnesota will be found with the article "State.")

What are the "mountains of the prairie" and where are they located?

What has the state done to protect its forests?

What is the distinguishing feature of Minnesota's compulsory education law?

Why was it a greater sacrifice for Minnesota to send its men to the Federal armies during the War of Secession than for the older, more thickly settled states?

For what is Minnesota's highest land noted? Of what special importance is it as a "great divide," or watershed?

What and where were the "Big Woods" of the Sioux Indians?

Of what kind of lumber and of what timber product does Minnesota produce more than any other state?

What distinction has this state in regard to its permanent school fund? What important industry by its growth contributes to this?

Of how many other states or territories has this region formed a part?

What natural resources led the first explorers and settlers to this region?

How large a proportion of the inhabitants are native born and of native parents? What nationalities make up the greater part of its foreign-born population?

What mineral product of Minnesota is of special interest in connection with the early Indian inhabitants of the region?

How does the greatest port of the state rank among the ports of the Great Lakes?

How did it happen that not all the territory constituting this state came into the possession of the United States at the same time?

If the population of Minnesota and that of Chicago were exchanged, would the state be more or less densely populated than at present?

What is there peculiarly fortunate about the location of the great iron mines? How do they rank among the mines of the world?

Show how the manufacturing industries of the state are a natural outgrowth of the other industries and of the natural resources.

In what form will you not see tobacco on sale in Minnesota?

Has this state more or fewer lakes than Michigan? Than Florida? How were the most of the lakes formed?

What does the state name mean?

What is the great advantage of the Minnesota climate?

What does the state do to prevent its rivers and lakes from becoming empty of fish?

How large a proportion of the boundary of this state is water? How large is its water surface?

How many entire states of the Union have an area smaller than the water surface of Minnesota?

What was Lake Agassiz? How is its old area utilized now?

What gives Minnesota a right to the popular name of the "Bread and Butter" state?

How has the state shown its progressiveness in connection with its penal institutions? What is meant by an *indeterminate sentence?*

What is the difference in the way a murderer is punished in Minnesota and in New York?

under contract to various companies, but since that time they have been employed in the prison, chiefly in the manufacture of binding twine and farm machinery. These industries, besides paying all the expenses in connection with the prison, as well as wages for the prisoners, which are sent to the families of the convicts, net the state a good profit.

Government. The constitution under which Minnesota is governed dates from 1857; a majority of all the members of both houses, as well as a majority of the voters at an election, is necessary to its amendment. At the head of the executive department is the governor. Other officers are the lieutenant-governor, secretary of state, treasurer, auditor and attorney-general, all elected for a term of two years, except the auditor, who holds office for four years. The veto power of the governor has been extended to separate items in the appropriation bills, and a two-thirds vote of both houses is necessary to pass any bill which the governor has vetoed.

The legislature consists of the usual two houses, a senate of sixty-three members, elected for four years, and a house of representatives of 119 members, elected for two years. The legislature meets in the odd-numbered years, and no session may be longer than ninety legislative days. No new bills may be introduced within the last twenty days of a session except by the governor's request.

The judicial department includes a supreme court of five justices, elected at large for a six-year term, and two commissioners appointed by the court itself; district courts, each with one or more judges, as the legislature may decide; and probate courts, one for each county. There are also justice courts which try petty cases and are presided over by justices of the peace.

Special Provisions. Minnesota has laws regulating the kind of employment in which children may engage, and the length of their working-day; a law forbidding the sale of cigarettes; minimum-wage laws, and a mothers' pension act. The liquor problem is in the county option stage—that is, the legal voters of any county may by a majority vote provide that no saloon license shall be issued therein. Women may vote only at school or library elections. See Minimum Wage; Mothers' Pensions.

History of Minnesota

Discovery and Settlement. Minnesota is the old Ojibwa territory—the land where those legends grew up which Longfellow embodied in *Hiawatha;* but these were not the only Indians who lived there, for over the rolling prairies to the south roamed the Sioux. In 1678 the first European visited the territory. He was a Frenchman, Duluth by name, who built a fort on the north shore of Lake Superior, though not on the site of the city which now bears his name. Two years later the famous missionary-explorer, Hennepin, discovered the Falls of Saint Anthony, and word went out that the woods and the rivers of the territory held great treasures for the fur traders. By 1700 several posts had been established and the claim of the French to the region had been recognized. At the close of the French and Indian War in 1763 England received from France the title to the eastern part, and twenty years later transferred it to the United States, but the western portion was not acquired until 1803, when the United States bought from France the great territory of Louisiana (see Louisiana Purchase). Zebulon Pike explored the country in 1805, and then began an influx of settlers, but not until 1819 was the first permanent American settlement, the military post of Fort Snelling, established.

Territorial Years. The part of Minnesota east of the Mississippi was for a time part of the territory of Indiana, then, successively, of Michigan and of Wisconsin, but not until 1838 did the Indians finally cede their rights to the territory. Development, meanwhile, had been steady, though slow. A mill was built at the Falls of Saint Anthony in 1822, in the next year a steamboat ascended the Mississippi to the Falls, and in 1836 lumbering on a commercial scale was begun, great rafts of logs floating off down the river, guided by skilful logmen. In 1841 there was built, not far from the Falls of Saint Anthony, a little chapel—the Church of Saint Paul, it was called; and this was the beginning of the present capital city.

In 1849, when the region had a population of about 5,000, it was organized as the Territory of Minnesota, with boundaries stretching far west to the Missouri River, but all the western portion was still held by the Indians. In 1851 they ceded their rights to the lands west of the Mississippi, and settlers poured into the newly-opened region so fast that by 1860 there was a population of 172,023. Three years before this latter date, however, Minnesota was admitted to the Union as the thirty-second state, with its present boundaries.

Growth as a State. Entirely apart from the region where slavery was a vital question, Minnesota was loyal to the Union during the War of Secession, furnishing about 25,000 men. But during that period it had a very serious problem of its own to solve, for while many of the strong young men were absent in the Federal armies, the Sioux Indians went on the warpath, attacking the frontier towns, killing over 600 white people and destroying nearly a million dollars' worth of property. Several hundred of the Indians were captured and brought to trial, and a number of them were hanged.

But all these Indian depredations could not intimidate the adventurous pioneers who had made up their minds to find homesteads in the fertile Minnesota region, and the new state grew rapidly. Railroads developed, towns sprang up, and emigrants flocked to this "far western country" from Europe, from those northern countries whose people make thrifty citizens. Occasional financial crises and disastrous forest fires, which destroyed villages and property and left hundreds of people homeless, were almost the only drawbacks to progress, and they proved but temporary. The discovery of iron ore about 1878 meant increased prosperity, but it was not until 1892 that the output from the wonderful Mesaba mines became so remarkable.

From the first years of its statehood until 1898 Minnesota was consistently Republican in politics, but since that date the Democrats have more than once been successful in electing their candidates. One Democratic governor, John A. Johnson, who first took office in 1905 and was twice reëlected, was especially popular, and gained a prominence in national affairs which brought him before the people as a possible candidate for the Presidential nomination of 1908. His death the following year ended an unusually promising career. In the election of 1912 Minnesota supported the national Progressive party headed by Theodore Roosevelt; in 1916 its Presidential vote was cast for Charles E. Hughes, Republican, by a plurality of 392 votes. A.O.E.

Consult Neill's *History of Minnesota*; Folwell's *Minnesota*, in American Commonwealths Series; Skinner's *Story of Minnesota*.

Related Subjects. The following articles in these volumes will be found to contain information that will be of interest in connection with a study of Minnesota:

CITIES

Duluth	Hibbing
Faribault	Mankato
Minneapolis	Saint Paul
Red Wing	Stillwater
Rochester	Virginia
Saint Cloud	Winona

HISTORY

Hennepin, Louis	Ojibwa
Hiawatha	Sioux
Louisiana Purchase	

LEADING PRODUCTS AND INDUSTRIES

Barley	Lumber
Dairying	Steel
Flour	Wheat
Iron	

RIVERS AND LAKES

Lake of the Woods	Rainy Lake
Minnesota River	Red River of the North
Mississippi River	Superior, Lake

MINNESOTA, UNIVERSITY OF, a coeducational institution which, in point of student enrolment, enjoyed, in 1916, the honor of being the largest state university in America. It was established by the territorial legislature of Minnesota in 1851, and was opened for instruction in 1869, at Minneapolis. The university maintains a graduate school; the college of science, literature and the arts; a college of engineering and architecture; the department of agriculture, including agriculture, forestry and home economics; schools of law and medicine, including a school for nurses; schools of mining and analytical and applied chemistry; the colleges of dentistry, pharmacy and education, and the extension department. Through the latter the people of the state may enjoy the advantages of correspondence courses, evening classes, lecture courses, field debates on public questions and a municipal reference bureau.

In 1884, when Dr. Cyrus Northrop became president of the university, it boasted one building and a student body of about 400. At the present time it is housed in over sixty buildings, which are located partly on the main campus, a stretch of land on the Mississippi River, comprising 109 acres and beautified by trees, lawns and walks; and partly on the university farm of 420 acres. On this farm are the buildings of the agricultural department and the main experiment station. The student enrolment is nearly 11,000, the faculty numbers about 650, and the university property is valued at over $12,000,000. There is a general library containing about 185,000 volumes and several special libraries.

In 1915 the university board of regents accepted from the eminent surgeons of Rochester, Minn., William J. and Charles H. Mayo, the facilities afforded by the Mayo Foundation, with the hospitals and laboratories under its control

and with its endowment of $2,000,000, to be used for medical and scientific instruction and investigation, under the direction of the graduate school of the university. The University of Minnesota belongs in a very intimate way to the people of the state. Every effort is made to bring to all citizens who desire it the opportunity to secure educational dividends on their investment. G.E.V.

MINNESOTA RIVER, a river of the United States which joins the Mississippi between the cities of Minneapolis and Saint Paul, in the state of Minnesota. It rises in foothills of South Dakota known as the Coteau des Prairies, and flows southeastward to Big Stone Lake on the boundary between Dakota and Minnesota. At Ortonville the river leaves the lake, which is twenty-six miles long, and flows southeast to Mankato, Minn., where it abruptly bends towards the north, entering the "Father of Waters" a few miles below the Falls of Saint Anthony. Its total length is about 470 miles and its drainage area covers about 16,600 square miles. The chief affluents are the Chippewa, Pomme de Terre, Redwood, Cottonwood and Blue Earth rivers. It traverses a fertile prairie country, and during high water small vessels ascend it about 295 miles from its mouth. Large steamers traverse the first forty-five miles of its course.

MI'NOR, a musical term, for explanation of which see MUSIC; SCALE.

MINORCA, *mi nawr' ka,* the second largest and most easterly of the Balearic Islands, owned by Spain and lying east of that country, in the Mediterranean Sea. The area, including adjacent islets, is 293 square miles, nearly one-fourth that of Rhode Island. The surface is rough and mountainous and the coast very rugged. There are several good harbors; on the best of these is Port Mahon, the capital. The island contains a quantity of valuable minerals, including iron, copper, lead, marble, porphyry and alabaster. The chief products are oil, wine, hemp, flax, oranges, lemons, cheese and honey. The natives are good sailors, but are not industrious, and are quite illiterate. The island has been owned by the Carthaginians, Romans, Vandals and Moors, and in recent times has belonged to England and to Spain. At the Peace of Amiens, in 1802, it was ceded by Great Britain to Spain in exchange for Gibraltar. Population, 1910, 42,000.

MI'NOS. For more than two thousand years boys and girls have read or have been told the story of King Minos of Crete, who sacrificed Athenian youths and maidens to the Minotaur, a creature half man and half bull, in his labyrinth, and when the boys and girls have asked, "Is the story true?" they have been told, "It is only a myth, a made-up story of the ancient Greeks." In this twentieth century they can be told for the first time that Minos really did exist, that he really had a labyrinth, and that he held bullfights in which girls as well as boys faced the bull weaponless. All this has been discovered since 1900, through the excavations in Crete by Sir Arthur Evans.

There are many more legends of Minos, and it now seems probable that this name, like *Pharaoh* in Egypt, or *Caesar* in Rome, was given to each member of a long series of Cretan kings who swayed the Eastern Mediterranean from perhaps 2500 B.C. to about 1500 B.C. In mythology the legends all concern one man. He was the son of Zeus and Europa, and once in nine years he consulted with his father in a cave still to be seen on the mountain side. After his death he was made judge in the underworld. See CRETE; MINOTAUR.

A very interesting book about the modern discoveries is Baikie's *Sea Kings of Crete.*

MI'NOT, N. D., the county seat of Ward County, situated northwest of the geographical center of the state and on the Mouse River. Grand Forks is 206 miles east and south. Minot is the distributing center for a large territory, having the service of the Great Northern and the Minneapolis, Saint Paul & Sault Sainte Marie railroads. Its industry is centered chiefly in the mining of lignite coal and in making flour and briquettes; ample water power for manufacture is derived from the river, which at this point has a fall of ten feet. The city has a Federal building, a post office, the state normal school, a fine courthouse, a public library, and a large park through which the river winds its course. The government is administered on the commission plan. Population, 1910, 6,188.

MINOTAUR, *min' o tawr,* or **MINOS'S BULL,** was the monster with the head of a bull and the body of a man which, according to Greek mythology, belonged to King Minos. Once every nine years seven youths and seven maidens from Athens were sacrificed to it, but on the third occasion the hero Theseus killed the Minotaur and found his way out of the labyrinth by following a thread which Ariadne, the king's daughter, had given him. Thanks to the wonderful excavations begun in 1900 by Sir Arthur Evans, it is now known that there is an

historical foundation for the story of the Minotaur. On the walls of the palace at Cnossus have been found pictures, painted 3,500 years ago, which represent girls and boys vaulting upon the back of a bull as it charges to gore them. Presumably these toreadors were trained from among captives, and from young people sent in tribute by Athens and other cities conquered by the Cretan fleets. The worship of a bull-headed god formed part of the early religion both in Crete and on the Grecian mainland.

HEAD OF THE MINOTAUR

A remarkable plaster relief discovered in 1900 on a wall of the palace of King Minos. It was executed nearly 3,500 years ago, in life size and in color. The eye has a yellow pupil and a red iris.

MINSK, the capital of a government in Russia of the same name, is situated on the Svislotch River, 468 miles southwest of Moscow. It has many good educational institutions, is the seat of the Orthodox and Roman Catholic bishops, and has cathedrals, theaters and a museum. The inhabitants are engaged in the manufacture of leather, hats, soap, woolen cloth, flour, tobacco, pottery and glass. Since the government proscription of the liquor trade, the result of the War of the Nations, the breweries and distilleries of Minsk have ceased to operate. In the city a fair is held in March of each year. Population, 1910, 105,400.

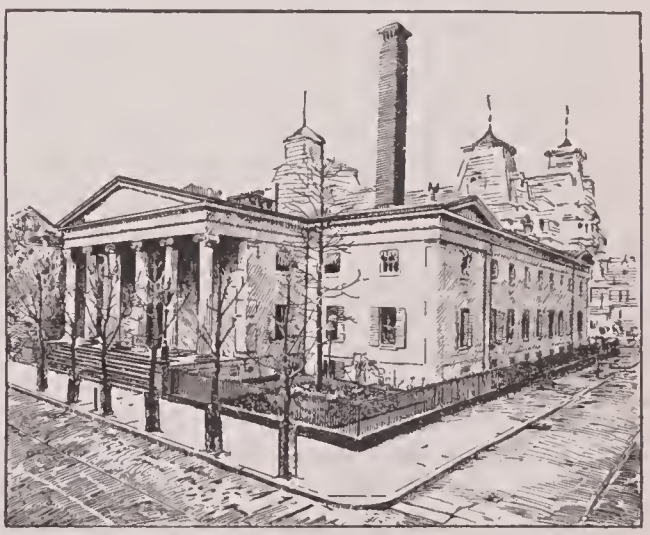
MIN'STREL, a word derived from the Latin *minister,* meaning a *servant,* is now generally applied to a class of poet musicians who flourished especially in the tenth and twelfth centuries. There was a division of classes among the minstrels, the appointed minstrel to the king or nobleman being considered above the wandering singers. The *scop,* as he was originally called, the minstrel who sang in the halls of great castles, generally made his own poetry and set it to the music of a harp. Minstrels were accorded the liberty of speech enjoyed by jesters, and were often treated as equals by their patrons, whose deeds and qualities they extolled in song. The rewards of minstrels were often large, pleased listeners bestowing on them jewels of great value.

The whereabouts of Richard Coeur de Lion are said to have been discovered by Blondel, his favorite minstrel, who wandered over Europe in search of him, and one day chanced to sing outside the castle in which Richard had been imprisoned by the Austrian emperor with whom he quarreled during the Crusades (see RICHARD I).

Modern Minstrelsy. Minstrels of the past fifty years blacken their faces and appear on the stage in group formation as colored people. They combine music, comedy, juggling and pantomime with other simple forms of entertainment. The first American traveling companies of this kind were the Christy Minstrels, who so quickly popularized Foster's *Suwanee River,* and the Virginia Minstrels, who at once made *Dixie* famous. The latter company, organized in 1843, is said to have been the first traveling minstrel entertainment in the world.

The greatest American minstrels doubtless were Primrose and West, who amused the world for twenty years. The leading twentieth century representative of this class of entertainers is Lew Dockstader. F.ST.A.

MINT, an institution where money is coined by the authority of the government. Originally individuals claimed the right to coin money, but the growth of commerce necessitated a uniform standard of values, and experience has shown the wisdom of delegating to the governments the exclusive right of making money. The United States mints are typical of all other mints.



THE MINT AT PHILADELPHIA

(For illustration of the Royal Mint at Ottawa, Canada, see page 1128.)

United States Mints. The first mint in the United States was established in Philadelphia by a national coinage act passed in 1792. Copper money was coined as early as 1792, silver in 1794 and gold in 1795. Because of the growth of population in the country, other mints became necessary, and there are now three; the others are located at Denver and San Francisco. The mints and all the assay offices are under

the supervision of the director of the mint, who is appointed by the President and is responsible to the Secretary of the Treasury. For description of an assay office and the location of America's assay offices, see ASSAYING, subhead *Assay Office*.

In Other Countries. The coining of the greater part of English money in London dates back to the time of William the Conqueror. The present mint on Tower Hill in London was established between 1810 and 1815. This mint supplies all the coinage for the British Empire except Australia and the East Indies, which are supplied by branch mints at Sydney, Melbourne and Perth. A fourth branch is located at Ottawa in Canada, and it produces the supply of Canadian coins and English sovereigns (see CANADA, page 1128). Only one mint is usually found in each of the countries of Europe. Mexico's national mint is in the City of Mexico. Africa has none. South America has four mints, at Buenos Aires, Santiago, Lima and Tegucigalpa, but most of the South American coinage is manufactured in Europe by contract.

For process of coining money, see COINAGE. For different coins now in use, see MONEY.

MINT, a family of plants which, according to one of the old myths, were named for Mentha or Mintha, a beautiful rival of Proserpina, whom the latter, in a jealous rage, turned into a plant. This group of herbs, distributed over almost all parts of the world, is characterized by its creeping rootstocks, square stems bearing opposite, pleasant-smelling leaves, and spikes of small, bluish or pinkish two-lipped blossoms. Probably the best-known species are peppermint (which see), much used as flavoring for candy and medicines, and *spearmint,* sometimes called *garden* or *mackerel* mint, employed as a flavor in cookery and chewing gum. From the lemon-scented leaves of *bergamot mint* comes a fragrant oil, a common ingredient of perfume, while dried *curled mint,* widely cultivated in Germany, is used medicinally for poultices and warm baths. Other species are *wild* or *brook* mint, resembling pennyroyal, and *stone, sweet* or *horse mint.*

MIN'TO, GILBERT JOHN MURRAY KYNYNMOND ELLIOT, Fourth Earl of (1847-1914), a British soldier and statesman, Governor-General of Canada from 1898 to 1904 and Viceroy of India from 1905 to 1910. Lord Minto was educated at Eton and at Trinity College, Cambridge, and immediately after his graduation in 1867 entered the Scots Guards as an ensign. He resigned from the army in 1870. During the Carlist Insurrection in Spain he accompanied the revolutionists, then served with the Turkish army in 1877 in the Russo-Turkish War, and in the second Afghan War was private secretary to Lord Roberts. From 1883 to 1885 he was military secretary to the Marquis of Lansdowne, then Governor-General of Canada, and was also chief-of-staff to General Middleton during the Saskatchewan Rebellion. In 1898 he returned to Canada as Governor-General, succeeding the Earl of Aberdeen. He remained in Canada until 1904, and from 1905 to 1910 was Viceroy of India in succession to the Earl of Curzon. It is an interesting coincidence that Lord Minto's great-grandfather, the first earl (1751-1814) was Governor-General of India from 1807 to 1813.

EARL OF MINTO

MINUIT, *min'u it,* PETER (1580-1641), a colonial governor of New Netherland, born at Wesel, Rhenish Prussia, who was noted for his determination, skill and energy. In 1625 he was appointed governor and director-general of New Netherland by the Dutch West India Company, and in 1626 he purchased Manhattan Islands from the Indians for sixty guilders, or about twenty-four dollars. He later built Fort Amsterdam. In 1631 he was recalled, but soon returned to America and built Fort Christiana, near the present city of Wilmington, Del., under the auspices of the Swedish West India Company.

MINUTE, *min'it,* a division of space and also of time. The ancient Babylonians used the sexagesimal system of notation; that is, they figured by sixes and sixties instead of tens and hundreds, as in the decimal system, now universally employed. As the Babylonian year had 360 days, the astronomers, in making their computations, divided the circle into 360 parts, each of which is now called a degree. A degree is divided into sixty parts, and each of these parts again divided into sixty smaller parts. When the Romans adopted the Babylonian system of division they called the parts of a degree the *partes minutae primae,* or *first small parts,* and the divisions of the first small parts became the *partes minutae secundae,* or *second*

small parts. In the course of time these phrases were each shortened to one word, *minutae* and *secundae;* in English these words became *minute* and *second.* At first used only in geometry and astronomy, the close relation of astronomy to chronology led to their use in measuring time. Thus the sixtieth part of an hour became a minute, and the sixtieth part of a minute became a second. See CHRONOLOGY.

MINUTEMEN, *min'it men,* the name given a class of volunteer militiamen who hold themselves ready for service at short notice. The term was specifically applied during the early period of the American Revolution, the men being ready for instant service whenever summoned. The minutemen were principally residents of Massachusetts who were enrolled according to an act passed November 23, 1774, by the Provincial Congress, and numbered about 16,000. Lowell, in *Among My Books,* said: "It was the drums of Naseby and Dunbar that gathered the minutemen on Lexington Common."

MIOCENE, *mi'o seen,* **PERIOD,** a division of the Cenozoic Era extending from the Eocene to the Pliocene Period. The rock formations of this period along the Atlantic coast of North America extend from Marthas Vineyard southward, and around the Gulf of Mexico. They consist chiefly of sand, sandstone, shell marl, and, in some localities, earths containing diatoms, such as Bermuda earth and Tripoli, which render them valuable for polishing purposes. The life along this coast indicates that the climate may have been cooler than at present. On the Pacific coast the Miocene formations are of slight importance. They occur in various places in California, and consist of shales and sandstones. In this period representatives of the highest order of mammals (the primates) made their appearance.

Related Subjects. The reader is referred to the following articles in these volumes:

Cenozoic Era	Geology (for diagram)
Eocene Period	Pliocene Period

MIQUELON, *me'k' lawN,* **ISLAND,** near the southeastern coast of Newfoundland, at the entrance to Fortune Bay, has an area of 83 square miles. The southern part, which was formerly separate but is now connected with the northern part by a sand bank, is called *Little Miquelon,* or Lungly Island. The island forms part of the French colony of Saint Pierre, having been in the possession of France since 1763, and now the only French territory in America remaining of all its former vast possessions. It is governed by the commandant of Saint Pierre and is occupied by a few families engaged in the fisheries. The total population numbers about 600.

MIRABEAU, *me ra bo',* GABRIEL HONORÉ RIQUETI, Count de (1749-1791), a French statesman, orator and revolutionary leader, often called "the tribune of the people," because he was bold in making demands in their interest. He was born at Bignon, and entered a military school in Paris in 1767. The same year he joined the Berry cavalry regiment, was imprisoned for misconduct on the island of Re, but was released on condition that he would join the Corsican expedition in 1769; this he did and in 1771 was commissioned captain of dragoons. For some time later he lived in Holland and in England, but returned to France in 1788 and was elected by the Third Estate to represent Aix in the States-General, or National Assembly.

MIRABEAU

Although he was always in debt and lived a dissolute private life, his wonderful powers of oratory soon made him one of the most important public figures of France. He early became identified with the French Revolution, and he attempted to place his abilities at the king's service and to work with Lafayette and Necker. He was viewed with suspicion, however, because of his character. In 1790 he became president of the Jacobin Club, and in 1791 was elected president of the National Assembly, a position which he coveted. He died three months afterward, his last words, with prophetic insight, being "I carry with me the ruin of the monarchy."

MIRACLE, *mir'a k'l,* a sign or mighty wonder performed to show the power of God, but only employed in a great cause or for a religious purpose. The miracles of the Bible were confined almost exclusively to four periods, which were widely separated. The first was during the return of the Children of Israel to Canaan under the leadership of Moses and Joshua; the second, during the struggle between Christianity and heathenism under Elijah and Elisha; the third, during the Exile in Babylon;

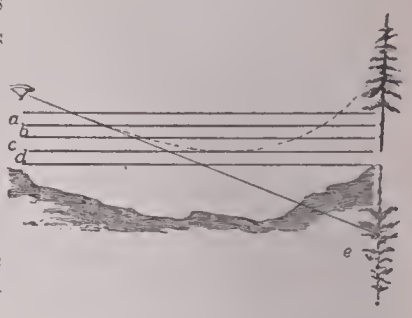
and the fourth, at the time when Jesus was on earth. They were unusual events, such as the dividing of the waters in the Jordan to allow the Children of Israel to cross, or the feeding of the five thousand with five loaves and two fishes, and all were intended to show divine authority. Thus people were often reassured or aided in their faltering faith in God, and thus miracles helped in establishing the kingdom of God on earth.

MIRACLE PLAY, a religious play or drama founded on subjects taken from lives of the saints or from Scripture narratives which were popular in England during the Middle Ages. These dramas were shown to the people at certain times of the year and reached their height of popularity in the thirteenth century, during the time of Chaucer. The institution of Corpus Christi Day, with its elaborate ceremonies and processions, gave a great impetus to these plays. They passed into the hands of tradesmen's associations or guilds after leaving the churches, as by Papal edict clerics, or those under holy orders, were forbidden to appear on the stage. The plays continued to be given until the reign of Elizabeth, when they ceased to have vital interest, but their influence was great in preparing the way for a more modern drama. Very few texts of these miracle plays have been preserved, but in structure and aim they were similar to the mystery plays (which see).

MIRAGE, *me rahzh'*. During the first invasion of Egypt by the army of Napoleon, in 1789, the soldiers were frequently annoyed by deceptive appearance of cool lakes across the shimmering expanse of heated desert air. One of the members of the expedition, a French mathematician named Gaspard Monge, gave what is supposed to be the first scientific explanation of this phenomenon, to which the name *mirage,* from the Latin word *mirari,* meaning *to wonder,* has been aptly applied.

It often happens in deserts that the air near the surface of the sand becomes abnormally heated, so there is a well-defined bounding surface between the lower strata and the cooler, denser layers of air above; this bounding surface acts like a reflecting mirror, in which objects appear inverted. A cloud or portion of sky, for instance, may be so reflected by this natural mirror that it will look exactly like a body of water lying on the sands of the desert. Since the reflecting surface often varies in position, owing to the constant addition of heat waves to the upper strata of air, the reflected cloud or bit of sky will seem to be a lake whose waters are being stirred by the wind.

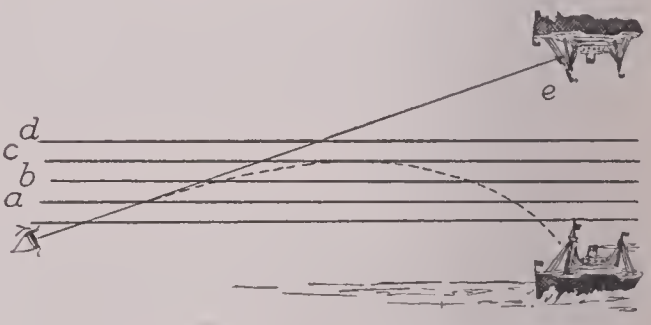
A common type of mirage is that in which trees are seen in an inverted position, as if reflected in a body of water. The ray from a tree top coming obliquely downward may be so bent from its first direction as it passes through the different layers of air that it is sent obliquely upward to the eye, but the eye follows the ray back in a straight line. The low, hot stratum of air serves as a reflecting mirror, and the observer imagines he sees in the distance a green oasis.



MIRAGE IN THE DESERT

Let it be supposed that the air strata decrease in density from *a* to *d;* a ray of light coming from an object (the tree) will be refracted in passing downward through the stratum *a,* still more in passing through *b,* and so on until it penetrates a stratum which may be *d,* where the ray is totally reflected. The direction of the ray will then be upward, but will be refracted toward the perpendicular as it passes through strata of increasing density, so when the ray reaches the eye the object will appear in the direction of *e.*

Mirages are also observed at sea, but in this case the denser layers of air are next to the surface of the water, and the reflected object seems to be suspended in the sky and inverted. The accompanying drawings show the direction taken by rays of light passing through layers of air of different densities, producing in one case mirage of the desert, and in the other mirage of the sea.



MIRAGE OVER THE WATER

Air is denser near the surface of the water than it is at higher altitudes, because the water cools it. The course of the rays is shown in the illustration. A vessel so far distant as to be hidden by the curvature of the earth will appear above the horizon when the rays of light are at first refracted from the perpendicular until the lighter stratum is reached at *d,* when total reflection takes place. By this the ray is given an inclination downward, so the object appears in the direction of *e.*

The *Fata Morgana (fah'tah mawr gah'nah)* is a form of complicated mirage occasionally observed in the Strait of Messina. It was so

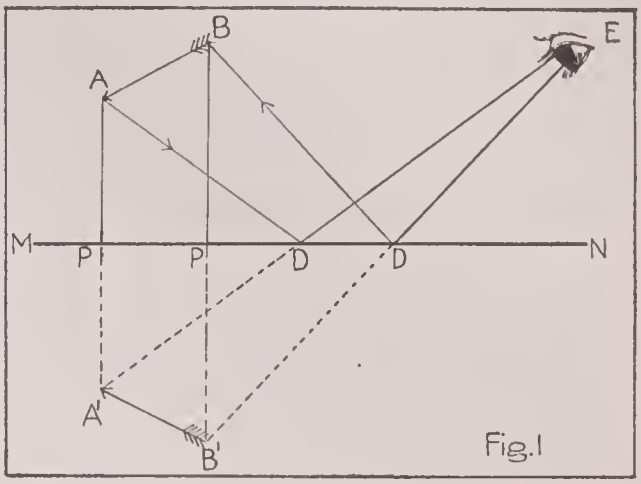
named because of the legend that it was the work of a fairy of the same name in medieval romances. C.R.M.

MIRAMICHI RIVER, *mir ah mi shee',* the largest river in New Brunswick, except the Saint John. It is a small stream, for it is only 135 miles long from its mouth to the headwaters of its principal tributary. The Miramichi is famous, not for its size but for its fish; it is one of the greatest salmon streams of the world, and is visited every year by hundreds of sportsmen. The whole Miramichi basin, which covers a little more than 5,000 square miles, is in fact a paradise for hunters. It has never been thoroughly explored, and moose, caribou, deer, bears, wolves, foxes and many smaller animals range the forests. In some sections the advance of the lumberman, however, has driven away the game. Pine woods line the banks of the river and its tributaries, and lumbering is now an important industry.

From its mouth in Miramichi Bay, an arm of the Gulf of Saint Lawrence, the river is navigable for large vessels as far as Newcastle, a distance of thirty miles. Up to this point it is practically an arm of the sea. About five miles above Newcastle the river proper comes to an end, and divides into the Northwest Miramichi and the Southwest Miramichi. The latter is the head stream, some of its numerous branches extending within a few miles of the Saint John River, in the western part of the province. By short portages between these branches and the tributaries of the Restigouche and the Saint John the Indians could reach any part of the present province in their canoes. The same possibility exists to-day for the sportsman and camper. H.V.B.

MIRROR, *mir'er.* Every person makes daily use of a mirror or looking-glass. Any smooth surface which is capable of reflecting the rays of light that fall upon it is a mirror. The ordinary looking-glass is a pane of glass coated on the back with a layer of silver or mercury. Mirrors are used not only for household and decorative purposes, but also in a great number of scientific and other instruments, such as microscopes, telescopes, searchlights, and the like. The action of the mirror is based on the general laws of reflection of light, which are: (1) the incident rays, the normal and the reflected rays are all in one plane; (2) the angle of incidence is always equal to the angle of reflection.

The mirrors used in our houses or public places are *plane* mirrors, that is, mirrors having plane surfaces. When you stand before such a mirror, your image is of the same size as yourself, and appears as far behind the glass as you are in front of it. The image is, however, reversed. Thus, when you raise your right hand, it appears to raise its left hand. Let us see how images are formed in a plane mirror. In Fig. 1



Construction of an image in a plane mirror.

let MN represent the mirror and AB the object. An observer placed at E will see the image $A'B'$ situated behind the mirror. That image is formed in the following way: From the point A rays of light are sent out in all directions. Some of these strike the mirror at the point D and are reflected towards DE. To the observer at E the point will appear to lie in the direction EDA'. Other rays will strike the mirror perpendicularly at the point P and will be reflected back in the direction PA. To an observer at E the point A will appear to lie along the line APA'. The image of A will therefore be found at the intersection of these two lines, that is at A'. In the same way the image of B will be formed at B', and those of all the intermediate points between A and B will lie between A' and B'.

A *concave* mirror is a portion of the inner side of a sphere. The center of the sphere, of which the mirror is a portion, is called the center of curvature. The line connecting the middle of the mirror with the center of curvature is called the principal axis. Any straight line from the mirror through the center of curvature is called a secondary axis. When rays of light parallel to the principal axis strike a concave mirror, they are reflected in such a way that they meet at a single point, called the principal focus. The principal focus is situated on the principal axis, halfway between the mirror and its center of curvature. Let us see how an image is formed in a concave mirror. In Fig. 2 let MN be the concave mirror, and AB the object. The line PC is the principal

axis, and a ray of light from A striking the mirror at M, parallel with the principal axis, is reflected at the principal focus F. The line MF must contain the image of A. Another ray from A passing through the center of curvature

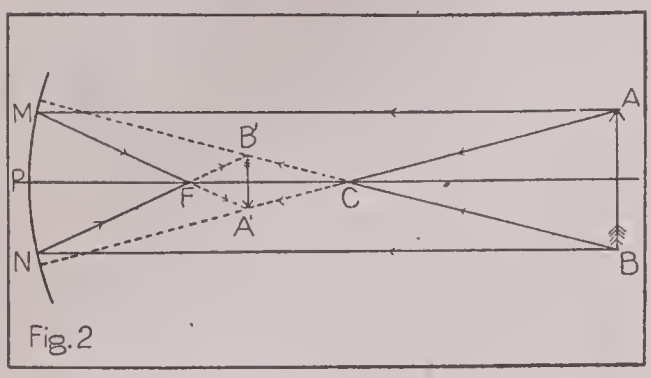


Fig. 2

Construction of an image in a concave mirror. The object is beyond the center of curvature of the mirror.

and striking the mirror is reflected back along the same path, CA; this line also contains the image of A. The image is, therefore, found at the intersection of those two lines, namely at A'. In the same way the image of B will be formed at B'. We see that the image is smaller than the object, inverted, and real.

In the example shown in Fig. 2 the object was beyond the center of curvature. When the object is situated between the center of curvature and the principal focus the image formed is larger than the object, inverted and real, and appears beyond the center of curvature. Reflectors for carriage lamps, bicycle lanterns, hand shaving mirrors, mouth mirrors used by dentists, all contain concave mirrors.

A *convex* mirror is a portion of the outer side of a sphere. The image is formed in the same way as in the concave mirror, but as the center of curvature and the principal focus are behind the mirror, the reflected rays have to be ex-

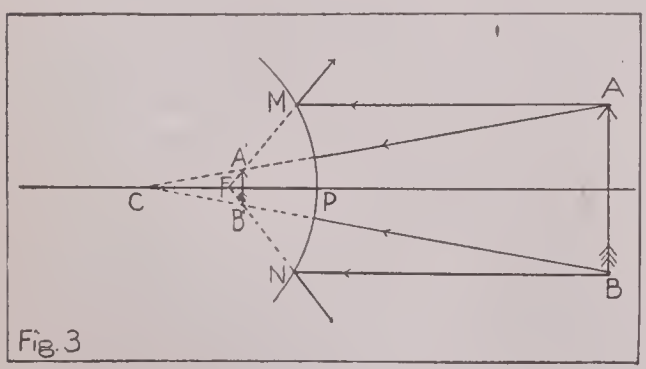


Fig. 3

Construction of an image in a convex mirror.

tended also behind the mirror in order to meet these points and to form the image. The image formed in convex mirrors is always behind the mirror, smaller than the object, erect and virtual. A polished ball reflects such an image.

The still waters of ponds and lakes were the only mirrors known to primitive man. The ancient peoples, the Egyptians, the Hebrews, the Greeks and the Romans, used mirrors made of polished metals, such as brass, bronze, silver and gold, and various alloys. Mirrors of glass were first made at Venice at the beginning of the fourteenth century. It was not until 1673 that the making of mirrors was started in England. Mirrors are coated on the back with a metallic covering. Formerly this coating consisted of an amalgam of tin and mercury; now silver is used. The silvering is protected by a coat of shellac varnish and on top of this by another coat of varnish that contains red lead.

Heat, as well as light, is reflected from a mirror, and a concave mirror can be used to bring the rays of heat to a focus. Objects can thus be set on fire or melted from a distance by means of reflectors that concentrate the rays of heat upon them. The most famous feat of this kind known in history is that attributed to the Greek mathematician *Archimedes,* accomplished during the siege of Syracuse in 213 B. C. It is said that Archimedes burnt the Roman fleet, or a part of it, by employing a set of concave mirrors which focused the rays of the sun upon the Roman ships in the harbor. C.R.M.

MISDEMEANOR, *mis de meen' er,* an offense of a less serious nature than a felony. Among the offenses so classed are assault and battery, malicious mischief and acts which make the offender a public nuisance. The laws of various countries, states and provinces differ, however, in defining such offenses, and what is a misdemeanor in one state may be classed as felony in another. Misdemeanors are usually punishable by fine or brief jail imprisonment.

MISHAWAKA, *mish a waw' ka,* IND., a manufacturing city, situated in the extreme northern part of the state, about midway between its eastern and western borders, and on the Saint Joseph River. By rail South Bend is four miles west, and Chicago is ninety miles northwest. The Lake Shore & Michigan Southern and the Grand Trunk railroads serve the city; there is also connection with the larger cities of the state by interurban lines. Belgians predominate in the foreign element of the population, which increased from 11,886 in 1910 to 16,385 in 1916 (Federal estimate). The city has an area of nearly four square miles.

Mishawaka has a variety of industrial establishments. Abundant water power is provided for manufactories by the Saint Joseph River, which at this point is spanned by three con-

crete bridges. About 5,000 people are employed in the three most prominent plants, whose products are wool boots, rubber goods, heavy machinery and water softener; windmills, furniture, church organs and launches are also extensively manufactured. Among the notable buildings are the Federal building, city hall, the $100,000 high school, the Methodist Episcopal church, erected at a cost of $200,000, and the Carnegie Library.

Mishawaka is one of the oldest cities in Northern Indiana. It was settled in 1828 and incorporated in 1834 as Saint Joseph Iron Works. The change of name was authorized by a special act of the legislature. *Mishawaka* was the name of an Indian chief. F.A.P.

MISSAL, *mis'al,* the book which contains the prayers and complete yearly service for the celebration of mass in the Roman Catholic Church, the name being derived from *missa,* meaning the *mass.* It was formed by uniting the separate books used in the service into one volume. In order to correct variations the Council of Trent ordered its revision, which was done by Pope Pius V in 1570, and its use was commanded in all churches which failed to show that its service book, or ritual, had been in unbroken use for two hundred years. Subsequent revisions were made in 1604 by Pope Clement VIII, and by Urban VIII thirty years later. Pope Leo XIII also made slight revisions regarding the rules in 1884 and in 1898.

MISSIONARY RIDGE, Battle of. See Chattanooga, Battle of.

MISSIONS AND MISSIONARIES, *mish unz, mish'un a riz.* It is through its missions and the consecrated workers who make them possible that the Christian Church is attempting to carry the gospel to all peoples. The immediate followers of Jesus became the first missionaries of earth. Paul is known as the great missionary to the Gentiles, and the work inaugurated by him and continued by his successors resulted, by the middle of the fourth century, in bringing the entire Roman Empire under Christian rule.

The second great missionary task was the conversion of Northern Europe, and this absorbed the energies of the Church for a thousand years. Illustrious names of this epoch are those of Ulfilas, the Apostle to the Goths; Patrick, missionary to Ireland, Columba, who carried the gospel to Scotland, and Augustine, the first Archbishop of Canterbury. Germany's early apostle was Boniface, who courageously attacked its pagan practices by cutting down the ancient oak that had for centuries been the place of sacrifice to the terrible god Thor. Ansgar, in the extremity of heroism, carried the gospel to the untamed Scandinavians, and Vladimir braved death to preach to the early Russian tribes.

The method of the missionaries of this era was to convert the kings from heathenism and then to baptize all of their subjects, the work of education naturally taking centuries to complete. As late as the thirteenth century several Slavic tribes still offered human sacrifice, and the people of Lapland and other far Northern regions were not brought to a knowledge of Christianity until after the Protestant Reformation.

Missionary effort in all lands received a new impulse at the beginning of the modern era of discovery and invention. Columbus and other pioneers of exploration were inspired in no small measure by their desire to evangelize the inhabitants of the lands beyond the seas. The Roman Catholic Church commissioned such men as the celebrated Xavier, who in the fifteenth century planted missions in India, China and Japan, and in the centuries following sent out devoted bands of Franciscans, Dominicans and Jesuits, who penetrated every part of the known world. The Catholic Society for the Propagation of the Faith, organized in 1822, still has complete control of the missionary activities of the Church.

Protestant Missions. The modern movement of Protestant missionary effort began in 1793 with the sending of William Carey from England to India. Robert Morrison landed in China in 1807, and Adoniram Judson was sent from America to Burma in 1813. A band of heroic souls early devoted themselves to the work in the South Sea Islands. Africa, long known as the Dark Continent, was opened to Christian influences through the heroism of David Livingstone, missionary and explorer. Japan, which had long before expelled Roman Catholic missionaries, was entered by Protestants after Perry, in 1853, had negotiated his epoch-making treaty with that country. Korea (now Chosen) received its first missionaries in 1885.

The method of the Protestant missionary is to go among non-Christian peoples, not primarily as a priest, but as a man and the head of a family, establishing a center for the social transformation of the community. Beginning with the founding of a home, he follows with church, school and hospital, preparing the way

for a general advance of the people through the scientific and commercial, as well as the moral and religious, benefits of Christian civilization. Protestant missionaries work under the direction of and are supported by their various Church boards, but aim, as rapidly as possible, to make the native churches self-supporting. Their success is illustrated by the financial report for 1914: though the American Protestant contributions to work in foreign lands amounted to seventeen millions of dollars, the native converts in their missions gave a sum equal to one-fourth of that amount. M.A.H.

Related Subjects. The following missionaries are given special treatment in these volumes:

Augustine, Saint	Livingstone, David
Boniface, Saint	Marquette, Jacques
Edwards, Jonathan	Patrick, Saint
Eliot, John	Paul, Saint
Grenfell, Wilfred T.	Smet, Peter John de
Hennepin, Louis	Whitman, Marcus
Joliet, Louis	Wilson, John
Judson, Adoniram	Xavier, Francisco

MISSISSIPPI, *mis i sip' i,* popularly known as the BAYOU STATE, a south-central state of the American Union, and one of the Gulf states, named after the mighty river that borders it on the west. This name is derived from two Indian words, *missi sepe,* which mean *great river,* or, literally, *father of waters.* As its flower, Mississippi has chosen the magnolia.

Size and Location. Mississippi, with an area of 46,665 square miles, of which 303 square miles are water, ranks thirty-first among the states in size. The state nearest to it in area is Pennsylvania. Its extreme length from north to south is 330 miles; its extreme width is 188 miles, and its average width is about 150 miles. It has a coast line of eighty-five miles. In addition to the mainland Mississippi includes a number of islands, namely, Ship Horn, Cat, Petit Bois and others, lying in the Mississippi Sound.

Its People. With 1,797,114 inhabitants in 1910, Mississippi ranks twenty-first among the states. The estimated population January 1, 1917, was 1,964,122. It has an average of about 41.5 persons to the square mile. In the period from 1900 to 1910 it increased its population by 245,844, a gain of 15.8 per cent. This is about the rate of increase shown by all the Southern states with large negro populations. Of the population in 1910, 43.7 per cent were whites, 56.2 per cent were negroes, as against 41.3 per cent whites and 58.5 per cent negroes in 1900. Mississippi has a larger percentage of negro population than any other state in the Union, but the state that has the largest number of negroes is Georgia. The foreign-born population, as in all other Southern states, is very small, numbering only 0.5 per cent of the total population.

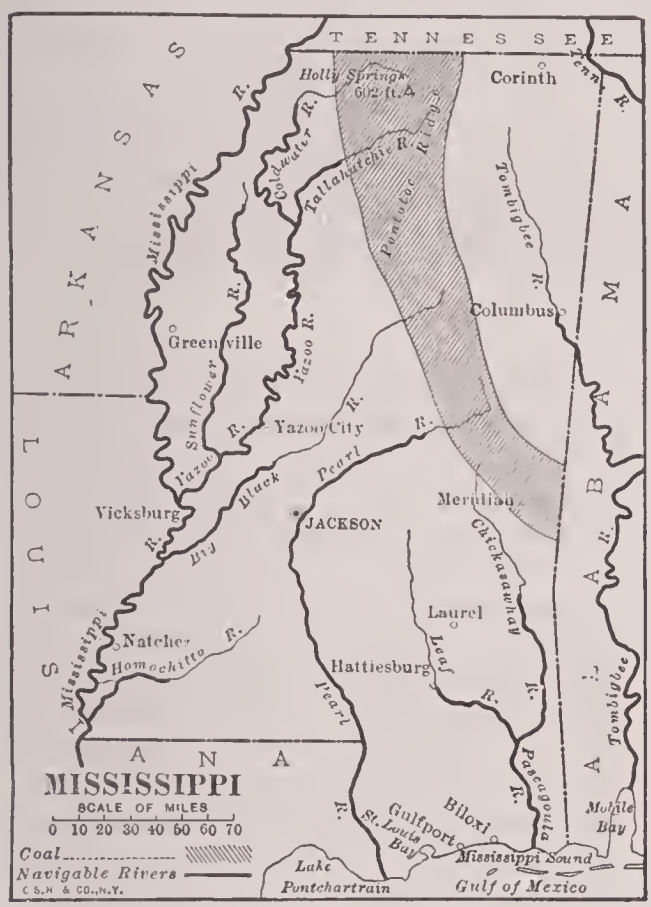
By far the greatest number of the people of the state live under rural conditions. Only 11.5 per cent (7.7 per cent in 1900) live in towns of 2,500 inhabitants or more. The principal cities in the state are Jackson, the capital; Meridian, Vicksburg, Natchez, Hattiesburg, Greenville, Columbus, Biloxi, Laurel, Yazoo, Gulfport, McComb, Greenwood, Brookhaven and Corinth. The most important of these are described under their titles in these volumes.

Their Religion. Over half of the people of the state are Baptists, and about thirty per cent are Methodists. The remainder are mainly Roman Catholics, Presbyterians, Disciples of Christ and Protestant Episcopalians.

Education. On account of its scattered and rural population, and of its great number of negroes, educational conditions in Mississippi were not satisfactory until recently. Since 1910 a series of measures have been introduced which are bringing good results. These include the establishment of agricultural high schools, the creation of a textbook commission, the establishment of a normal school for the training of teachers and the nomination of a supervisor of elementary rural schools. The schools are maintained from a permanent school fund, which is supplemented by local taxation and by a poll tax of $2 a year from each registered

voter. The administration of the schools is in the hands of a state board of education, composed of the governor, the attorney-general and the superintendent of education. Each county has its own school superintendent, elected for four years. Separate schools are provided for white and colored children.

At the head of the educational institutions are the state university, situated at Oxford; an agricultural and mechanical college at Starkville, a normal school for training white teachers at Hattiesburg, and the Industrial Institute



OUTLINE MAP OF MISSISSIPPI

Showing the boundaries, navigable rivers, principal cities, coal deposits and the highest point of land in the state.

and College at Columbus, for the education of women. Several educational institutions are maintained by religious denominations, such as Mississippi College at Clinton, Millsaps College at Jackson, Meridian College at Meridian. Rust University at Holly Springs; Tougaloo University near Jackson; Alcorn Agricultural and Mechanical College at Westside; Campbell College and Jackson College at Jackson, and the industrial schools at Holly Springs and Vicksburg are among the higher educational institutions provided for negroes.

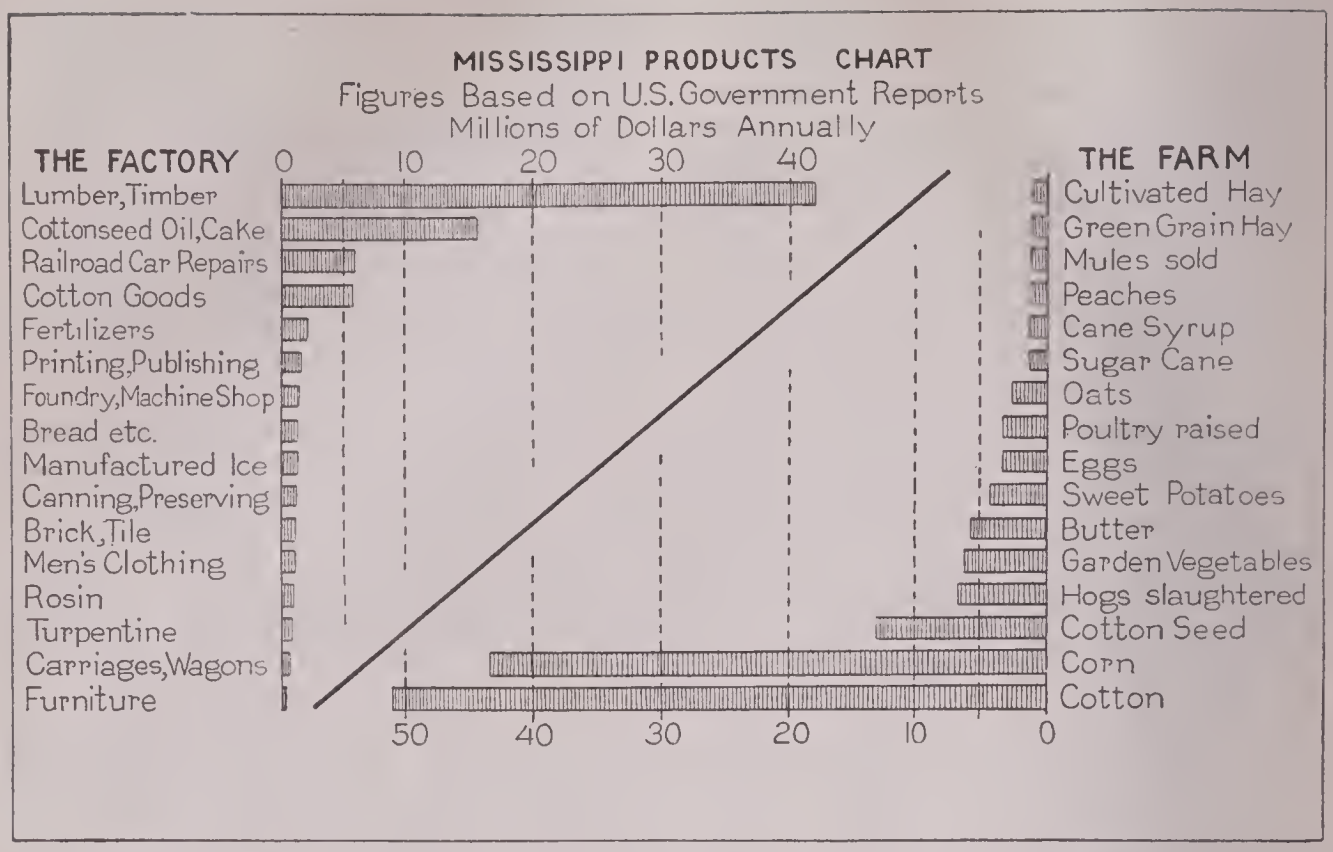
In the percentage of its illiterates Mississippi ranks rather high, owing to negro population. The percentage of illiterates in 1910 was 35.6 among negroes, 15.1 among foreign-born whites, and only 5.2 among native whites. See ILLITERACY.

Charitable and Penal Institutions. The state maintains a school for deaf and dumb children and one for blind children at Jackson. There are hospitals for the insane at Jackson and Meridian, and the state maintains several hospitals at Jackson, Natchez and Vicksburg. The state penitentiary is at Jackson, and convicts are also employed on several state farms and plantations. These farm penitentiaries are controlled by a board of trustees elected by the people. Mississippi has abolished the system of hiring convicts to corporations or private employers.

Physical Features. Mississippi is crossed from north to south by a broad, low ridge, which divides the state into two river basins—the eastern, which is drained into the Gulf of Mexico, and the western, which drains into the Mississippi River. To the west of this ridge the surface slopes gradually into the bottom lands of the Yazoo and the Mississippi. These lands are low and level. A characteristic feature of the surface of the state is the strip of land contained between the Yazoo and the Mississippi rivers, known as the Yazoo Delta. This extends about 175 miles from north to south and covers an area of 7,000 square miles. The land is so low that it requires an unbroken line of levees, or artificial banks, fifteen feet high, to protect it from overflow (see LEVEE). A belt of hills or bluffs, varying in height from 100 to 300 feet and cut by deep ravines, extends along the eastern edge of the delta and southward along the Mississippi. The eastern part of the state is formed by level or slightly rolling prairies, while on the south and along the Gulf coast there is a low, marshy tract.

The principal streams in the eastern part of the state are the Tombigbee, the Pearl and the Pascagoula, all flowing into the Gulf of Mexico. The chief tributaries of the Mississippi are the Yazoo, the Big Black, the Tallahatchie, the Sunflower and the Homochitto.

Climate. The state has a semitropical climate. The summers are long, but the intense heat that would otherwise prevail is tempered by breezes from the Gulf, and the thermometer seldom reaches 100° F. The mean temperature for the summer is about 81° F. The winters are short and mild, the mean temperature being about 45° F. Winters are longer and more severe in the northern parts of the state, but even there frosts occur only during five months.



The southern part is free from frosts during ten months of the year. The average annual rainfall is fifty inches in the north and sixty inches in the south, and is evenly distributed throughout the year.

Forests. Almost the entire region was formerly covered with dense forests, and even now about 17,500,000 acres, or nearly sixty per cent of the total land area, is classed as timber land. In the south the long-leaf pine predominates; the Yazoo valley is covered with cypress, and farther north are hardwoods, such as cottonwood, hickory, ash, elm, maple and oak. The forests of Mississippi are noteworthy for the great variety of trees they contain, over 120 species of trees being found.

Agriculture. Agriculture is the chief occupation of the people, and is favored by the highly-fertile soil. The black loam of the prairies and the silt of the bluff or hilly belt are exceedingly productive, but the most fertile soil in the state is the alluvial bottom lands of the Mississippi. Perhaps nowhere else in the world is to be found soil of such depth and richness as that which covers these bottom lands. It is, therefore, not strange that nearly two-thirds of its total area of over 29,500,000 acres is occupied by farms. About sixty per cent of the farmers are negroes, and nearly all of these are tenants.

Cotton and corn are the two chief crops, and these are grown in every part of the state. The largest yield of cotton is obtained in the Yazoo delta, which is one of the greatest cotton-producing regions in the world. With about 3,000,000 acres planted to cotton Mississippi ranks fourth in acreage, coming after Texas, Georgia and Alabama. With a production usually over 1,000,000 bales, it ranks fifth among the cotton-producing states. Corn is the leading cereal produced, covering over 3,000,000 acres, which yield about 60,000,000 bushels. Oats, with an area of about 200,000 acres and a production sometimes over 5,000,000 bushels, is the only other cereal cultivated to any extent. In sweet potatoes, with 70,000 acres cultivated, and a production of 6,000,000 bushels or more, Mississippi is sometimes the second state in production. Garden vegetables, hay and sugar cane are the other chief products.

Except peaches, no orchard fruits are grown to any extent. Figs grow well in the southern half of the state, and a few oranges and grapes are raised on the Gulf coast. Apples, strawberries, pears and plums are the most prominent among the minor fruits, and the pecan, the most important nut, is increasing in importance.

Manufactures. The industries of the state are not yet well developed. Until recently the lack of coal, the absence of a good seaport and the scarcity of labor were all causes that hindered any great industrial activity. The most important single industry is that connected with lumber and timber products. This represents

more than half of the total value of the manufactures of the state, being about $43,000,000 out of a total of about $80,000,000. In the production of rough lumber Mississippi ranks third among the states of the Union, yellow pine representing the greatest percentage of the timber cut. There are in the state over 900 sawmills.

Next in importance is the manufacture of cottonseed oil and cake. This is an industry which has sprung up only during the last two decades, and has attained large proportions. Formerly the cottonseed was simply thrown away as useless. Now there are large factories here and in the other Southern states that press out the oil from the cotton seeds, and transform the residue into cakes for feeding cattle. These products are worth millions of dollars (see COTTON). The manufacture of cotton goods is advancing steadily. Another important branch of industry is the manufacture of fertilizers from minerals, bones and the products of the cottonseed mills.

Transportation. Mississippi has excellent transportation facilities. Important trunk lines cross the state from north to south through the eastern, central and western portions, and other lines cross these from east to west. The state had 4,380 miles of railroads in 1916; the principal lines are Yazoo & Mississippi Valley, the Illinois Central, the New Orleans, Mobile & Chicago, the Mobile & Ohio, the Southern and the Mississippi Central railways.

The Mississippi River, which forms the whole western boundary of the state, constitutes a remarkable commercial waterway. The improvements effected at Gulfport in recent years have made it a valuable seaport, with a rapidly growing export trade, and the possibilities of development are almost endless.

Government and History

How the State Is Governed. Mississippi is governed under a constitution adopted in 1890. This is the fourth constitution since the state's admission to the Union in 1817. It may be amended by a two-thirds vote in each house of the legislature, indorsed by a majority vote of the people. The most interesting clauses of the constitution are those dealing with the franchise, which have been framed with the purpose of securing the political supremacy of the white race. A literacy or educational test restricts the right to vote to those persons who are able to read, or if unable to read, to explain, when read aloud to them, any part of the constitution. This test has greatly reduced the negro vote.

The executive officials, the governor, lieutenant-governor, secretary of state, treasurer, auditor and attorney-general are elected for four years. The governor, treasurer and auditor are not eligible for immediate reëlection.

The legislative power is vested in a senate of forty-five members and a house of representatives of 138 members, elected for four years. Sessions are held every two years, beginning in January of even-numbered years, and their duration is not limited. Mississippi sends eight members to the United States House of Representatives.

At the head of the judicial department is the supreme court, which consists of six members, appointed by the governor with the approval of the senate for terms of eight years. Each county has a chancery and circuit court, presided over by judges elected by the people for four years. There are, besides, in each county district courts presided over by elected judges, and there are also justices of the peace.

For purposes of local government the state is divided into counties, each administered by a board of supervisors composed of five members, one for each of the five districts into which the county is divided. The towns and cities may adopt the commission form of government, also the recall and initiative. After six years under commission government any city may vote to abandon its commission charter.

Other Constitutional Provisions. Mississippi has adopted the primary election law providing for the direct nomination of all state, district and county officers. In 1908 the state prohibited the liquor traffic, and has since passed several measures for strengthening that law. The agreement of nine jurors constitutes a verdict in civil suits. The giving of tips in hotels, restaurants, dining and other cars is forbidden. The employment of children under twelve years of age in factories and mills is unlawful, and children under sixteen years must not be employed for more than ten hours a day at any occupation.

Mississippi was one of the earliest states to recognize the rights of married women; they are placed on an equality with their husbands in buying or selling property or making contracts.

History. Before the advent of the white man these regions were inhabited by three powerful tribes of Indians—the Chickasaws in the north, the Choctaws in the center and the Natchez in the southwest. In addition, there were some other weaker tribes, such as the Yazoos in the Yazoo valley the Pascagoulas and the Biloxis on the borders of Mississippi Sound. The region was first explored by the Spanish adventurer De Soto in 1541 (see De Soto, Fernando). The French explorer, La Salle, took possession of the country in the name of France in 1682, this region being included in what was known as Louisiana (see La Salle, René-Robert).

The first settlement in the present state by the French was at Biloxi, in 1712; the second, at Fort Rosalie, now Natchez, in 1716. The territory did not prosper under French rule, and it was ceded to Great Britain in 1763. Immediately immigrants arrived in considerable numbers from the English colonies on the Atlantic coast, and also from Scotland, and the colony began to flourish. In 1781 England ceded the southern part, known as West Florida, to Spain. By the Treaty of Paris, in 1783, which closed the Revolutionary War, the northern boundary of West Florida was placed at 31° latitude, and a long dispute between Spain and the United States resulted. This lasted until 1795, when Spain released its claim to the territory north of that line. In 1798 the territory of Mississippi was organized; this was extended in 1804 to the boundary of Tennessee, and in 1813 to the Gulf of Mexico.

Progress as a State. On December 10, 1817, Mississippi was formally admitted as the twentieth state of the Union. Jackson, the capital, was founded in 1821. In 1816 the Chickasaws, and in 1832 the Choctaws, ceded to the United States their lands, which were thrown open for settlement. The state was greatly opposed to the antislavery movement, and adopted the Ordinance of Secession on January 9, 1861. One month later Jefferson Davis of Mississippi was elected President of the Confederacy. In or on the borders of the state were fought the

RESEARCH QUESTIONS ON MISSISSIPPI

(An Outline suitable for Mississippi will be found with the article "State.")

How can you tell whether Mississippi was named for the great river or the river was named for the state?

How many states have a greater area than Mississippi? How many have a greater population? What state is nearest it in size?

How many states were admitted to the Union after the close of the Revolutionary War and before Mississippi became a state?

How does Mississippi compare with Minnesota as regards proportion of foreign-born citizens? With Massachusetts?

Do more of the people live in cities or in rural districts? How many people out of each hundred live in a town of more than 2,500 inhabitants? Does this percentage seem to be increasing or decreasing?

What has made the educational problem a difficult one to solve in this state?

Do all voters help pay the tax levied for school purposes, or only those who have children? How is the tax levied?

Show by statistics that illiteracy in the state is noticeably decreasing.

What is the Yazoo delta? How is it protected from the overflow of the Mississippi? What is its area?

Into what body of water does all the drainage of the state find its way? By what different routes does it reach its goal?

Why is it not so hot in this Southern state as one might expect? How many "growing months" has the northern part of the state?

How large a part of the surface is covered with forests? Is this a larger or a smaller proportion than Florida has? Than Arkansas?

Why would this state be an excellent field for the botanist who was especially interested in trees?

What is meant by *alluvium?* What has it done for Mississippi?

How large a proportion of the area of the state is in farm land?

Where is the great cotton-producing section of the state? How many states produce more cotton? How many have a larger area devoted to it?

Why has the development of the manufacturing industries been comparatively slow in this state?

Upon what natural resource is the chief industrial enterprise dependent?

What product that is of very considerable value is made from materials that was formerly regarded as waste?

How many constitutions has the state had? How long has it been governed under the present one?

How has the number of negro votes been decidedly reduced?

What stand has Mississippi taken on the prohibition question?

Why is it less expensive to eat at a hotel or restaurant in Mississippi than in most other states?

What important cities were named for the early Indian tribes? What river took its name from an Indian tribe?

To how many nations has the territory constituting Mississippi belonged? What was the southern part originally called?

What especial honor fell to a Mississippi citizen on the organization of the Confederacy?

battles of Shiloh, Corinth, Port Gibson, Vicksburg and other smaller engagements, and a large part of the state was devastated during the War of Secession by the opposing armies. In 1867, during the reconstruction period, the state was placed under military government; in 1870 it was readmitted to the Union, after it had adopted a constitution enfranchising the negroes and had ratified the Fourteenth and Fifteenth amendments to the Federal Constitution. During the period of reconstruction the

AT NATCHEZ
Residence of the Spanish governor in 1781.

state was greatly disturbed by the struggle between the whites and negroes and by the extravagance and corruption of its officials. In 1875 the Democratic party obtained a majority in the legislature, and has remained in power in the state since that time. It required over a quarter of a century to recover from the losses suffered during the War of Secession, and to readjust the state's economic life to the new conditions, but after 1890 it entered upon an era of prosperity. Since that time Mississippi has made great strides in the development of its agricultural and industrial resources. The political reforms it has adopted and the social legislation it has introduced have brought the state in line with some of the most advanced states in the Union.

In national politics Mississippi has always been Democratic, except in 1840, when it voted for Harrison, the Whig candidate, and in 1872, when its vote was given to Grant. O.B.

Consult Ellett's *Outline of Mississippi History;* Garner's *Reminiscences of Mississippi.*.

Related Subjects. The following articles in these volumes will be of interest in connection with a study of the geography and the industrial life of Mississippi:

CITIES

Biloxi	Laurel
Columbus	Meridian
Hattiesburg	Natchez
Jackson	Vicksburg

LEADING PRODUCTS

Corn	Lumber
Cotton	Sugar Cane
Cottonseed Oil	Sweet Potato

RIVERS

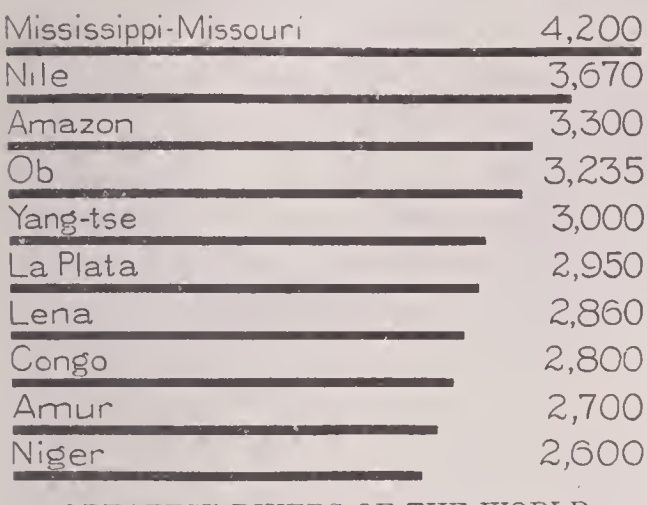
Mississippi	Yazoo
Tombigbee	

MISSISSIPPI, UNIVERSITY OF, was chartered in 1844 and opened four years later, at Oxford. Since 1882 the institution has been coeducational. It is one of the original members of the Association of Colleges and Preparatory Schools of the Southern states, and its entrance requirements are those adopted by this organization. Students from approved high schools which meet certain standards are admitted without examination. There are about thirty-five members of the faculty, and the student enrolment is over 650, to which should be added nearly 500 who attend the summer term. The university possesses a general library of about 29,000 volumes, a law library of 2,000 volumes, and grounds and buildings valued at $500,000. Except during the period of the War of Secession, the university has been in operation since it was first opened. Courses offered lead to the degree of Bachelor of Arts, Bachelor of Science, Bachelor of Laws, Bachelor of Engineering, Bachelor of Arts in Education, Bachelor of Science in Education, Graduate in Pharmacy, Master of Arts and Civil Engineer. There is also a two-years' course in medicine, for which a certificate is awarded. The grounds and buildings are valued at nearly $700,000.

MISSISSIPPI RIVER, the "Father of Waters," the greatest river of North America, and one of the greatest in the world. Indeed, if the Missouri, instead of the northern reaches of the Mississippi proper, be taken as a part of the main stream, it is the longest river in all the world. It has had a history as interesting as that of a living thing, for it has borne on its waters the dancing canoes of the Indians; those of the determined missionaries and explorers; the rafts and boats of the early settlers, and, still later, the commerce of the rich, central section of a great nation. Nor, it seems, is this last-named phase of its existence past, for present indications are that its importance as a commercial stream is to become again more nearly what it was a half-century ago (see subhead *Commerce,* below).

Its Course. Few of the world's largest rivers lie entirely within any one country, but the Mississippi with all its immense drainage system is wholly within the boundaries of the

United States. From the time it leaves its reedy source in Northern Minnesota until it pours its vast floods into the Gulf of Mexico, it touches only the one country. From its source to its mouth it is 2,459 miles long, but because of occasional cut-offs at the loops and



GREATEST RIVERS OF THE WORLD

The Mississippi and the Missouri are usually considered as one river system. The diagram shows graphically the comparative lengths of the ten greatest rivers, in miles.

the back-cutting toward the sources, the length is decreasing at one time and increasing at another, sometimes as much as fifty miles during a year.

As popularly stated, it has its rise in Lake Itasca, but the lakes of that region are so numerous and so confusing that it is impossible to say in just which one the great river really has its source. But when it issues from Lake Itasca, which is 1,470 feet above sea level, it is a little stream ten or twelve feet wide and less than two feet deep. It rushes on swiftly in a northerly direction for a time, and then, twisting and circling, finds its way through lake and swamp and over rapids until it settles into its generally southeasterly flow. Tributaries join it here and there, some of them almost as large as the main river, and by the time it reaches Minneapolis it has grown to a considerable size. Still, no one looking upon it here would call it the "Father of Waters;" it must have been the Indians farther along in its course who named it.

Thus far it has been entirely within the state of Minnesota, but soon after it passes Saint Paul it ceases to run through the state and becomes the boundary between Minnesota and Wisconsin, nor does it again cross a state until, just before it reaches its mouth, it cuts across the southeastern corner of Louisiana. Meanwhile it has been bordered, on the west, by Minnesota, Iowa, Missouri, Arkansas and Louisiana, and on the east by Wisconsin, Illinois, Kentucky, Tennessee and Mississippi. It winds now to the east and now to the west in great curves, which are everywhere broken by lesser windings.

Tributaries. It receives constantly from both sides other rivers and streams—some tiny, some the centers of great drainage systems. The Wisconsin, the Des Moines, the Illinois, the Kaskaskia, the Ohio, the Arkansas, the Yazoo and the Red—these are a few of the more important tributaries, but most of them are insignificant compared with the Missouri, which pours in its vast floods a little above Saint Louis. Altogether, there are comprised in the Mississippi system no fewer than 250 tributaries and their branches.

Some Interesting Figures. As stated above, the length of the Mississippi proper is 2,459 miles, but the longest river in the world, which includes the Missouri throughout its entire course and the Mississippi below its junction with that other giant stream, has a total length of 4,200 miles. Geographers consider the Missouri the trunk stream, though it is popularly regarded as a tributary. The whole system, main streams and tributaries, affords almost 14,000 miles of navigable waterway, much of which lies between fertile banks in the richest part of the country. About forty-one per cent of the United States, Alaska excepted, sends its waters by this vast system to the Gulf of Mexico, for the drainage basin has an area of 1,240,050 square miles. In width, there are, of course, great variations, but nowhere is the river crowded between narrow banks, and so reduced to a rushing torrent, as are some of the Western rivers which start out as broad, sluggish streams. At Saint Paul the Mississippi is 300 feet wide at low water, but by the time it receives the Illinois its breadth has increased to 1,400 feet.

The Missouri makes a great change in it, and in some places, between the mouth of that river and the mouth of the Ohio, the natural width is as much as 7,000 feet. Here, as elsewhere, projects for the narrowing and deepening of the river are on foot, and where these improvements have been introduced the stream does not exceed 2,500 feet. Below the mouth of the Ohio the natural river is sometimes 10,500 feet across, but the projected width is 3,000 feet (see subhead *Floods,* below). The depth, too, varies greatly; in some places, even after the stream has become a great river 1,500 feet across, its shallower parts in mid-channel may not be more than two feet deep, while be-

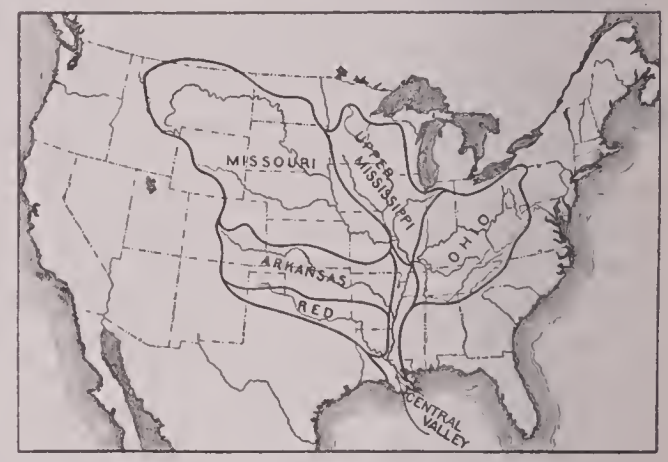
low New Orleans the depth is from thirty to sixty-two feet. Improvements are constantly in progress, and the tendency is everywhere to increase the minimum depth.

As to the volume of water poured by the Mississippi into the Gulf of Mexico, that is almost beyond conception. Every second during high-water season about 2,300,000 cubic feet are poured out, and the annual average is 675,000 cubic feet per second. Water is not the only thing carried down by the stream; it is estimated that in a year the Mississippi empties into the Gulf about 400,000,000 cubic yards of solid matter. No wonder it has built for itself one of the most extensive deltas in the world. Except the dust which is blown into the Missouri in the semiarid region, all the sediment is scoured off the higher slopes where the current is swift. In the prairie region, where the current is comparatively slow, the water cannot carry the sediment and must therefore drop and flow around it, thereby making the loops of the lower reaches.

Character of the River. Is the Mississippi a sluggish or a rapid stream? Are its waters limpid or muddy, its banks low or steep? In so long a river there is a chance for endless variations, and these the Mississippi shows in abundance; but most of its scenic beauties are to be found in its upper course, before it receives the muddy Missouri. At Minneapolis the river leaves its clay banks and flows between towering bluffs, and here, where it leaps over the Falls of Saint Anthony, used to be one of the beauty spots of the region; but commercial enterprise, making use of the water power, has destroyed the picturesque setting. Between Saint Paul and Saint Louis the river shows many and varied beauties. Its valley, from one to three miles wide, is bordered here and there by bluffs of sandstone or of limestone, and the river in its windings touches now the eastern, now the western bluff. The bluffs are for the most part heavily wooded, but here and there, especially in the Saint Louis region, they form veritable rugged palisades.

In its northern course the river is clear and placid, and when the Missouri pours in its waters a curious thing may be observed. For miles the two streams flow side by side, their waters scarcely mingling, the red, muddy waters of the western stream presenting a distinct contrast to the clearer water from the north; in time they mix, and through the rest of its course the Mississippi is turbid. Its lower course, too, is between flat shores formed by its own silt—an alluvial valley as rich as that of the Nile. It twists and winds, forms bayous and lakes, and frequently changes its channel; and through much of this region the surface of the river at high water is above that of the bordering flood plain, and the waters are confined only by the banks which they have built. Finally, through its varying channel which becomes narrower below the Yazoo, the river reaches the delta—a marshy stretch of fine sediment which in places is impassable. Here it divides into several arms, and pours its vast store of water into the Gulf. See illustration, under the title JETTY.

Floods. It is impossible to describe the Mississippi without referring to its floods, with which man has waged war for many years, and not always successfully. Heavy and long-continued rains swell its tributaries, and since in the lower stretches much of the surrounding country is but slightly higher than the surface of the river at low water, the result is disaster. Such floods occur in the spring, when the river is normally highest, and there have been many in the history of the river; but the greatest and most destructive was that of 1912. About $42,000,000 worth of property was destroyed, and some lives were lost. In the following year occurred another great flood, but the levees stood the strain better and not so much damage was done. See LEVEE.

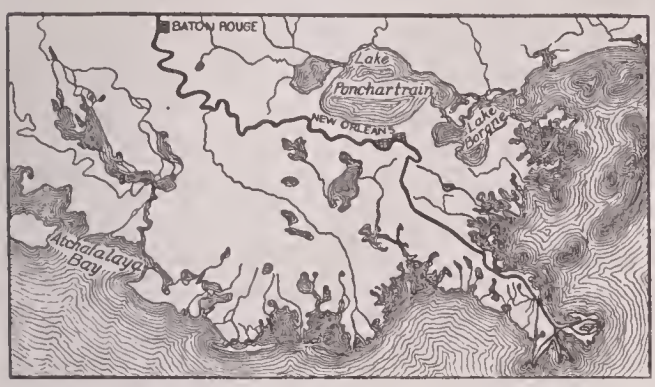


DRAINAGE BASINS

The approximate limits of the drainage basins of the rivers whose waters reach the Gulf through the Mississippi. The area of each basin and its percentage of the entire system appear in the following table:

DESIGNATION	SQ. MI.	PER CENT
Ohio Basin	201,700	0.16
Upper Mississippi Basin	165,900	.13
Missouri Basin	527,150	.43
Arkansas Basin	186,300	.15
Red Basin	90,000	.07
Central Valley	69,000	.06
Totals	1,240,050	1.00

Man has not tamely submitted to the ravages of the river, and the methods resorted to for protection have been various. First of all, there have been constructed works, which by confining the river in a narrower bed have com-



LOWER COURSE, AND DELTA

pelled it to scour out a deeper channel. These are not masonry walls, but dams composed of piles driven into great heaps of brush. Then there are the dams or levees which protect the river banks throughout much of the region below Cairo, Ill., where the great river receives the Ohio, for south of that is the flood locality. In moderate flood years the levees afford adequate protection, but when an unusual flood occurs, breaks or crevasses appear here and there, and the water spreads over the lowlands. Jetties for deepening the channel have been constructed, especially in the region of the "passes," into which the river divides as it finds its way across the delta. See JETTY.

Power Dams. Several great power dams have been built at various points on the river. The first is at Bemidji, thirty-two miles below Lake Itasca, and there are others at Grand Rapids and at Brainerd, 300 miles from Bemidji. From Brainerd to Minneapolis, a distance of 150 miles, there is a fall of 444 feet, about 135 of which is utilized by six power dams. A large lock and power dam, completed in 1915, was built by the United States government between Minneapolis and Saint Paul, and at Keokuk, Iowa, the Des Moines Rapids have been replaced by a beautiful artificial lake about a mile wide and from fifty to sixty miles long, through the construction of a magnificent concrete dam (see KEOKUK, IOWA, subhead *Keokuk Dam*).

Commerce. Back in the days of the Indians and the early settlers, everything which the North had to sell to the South went down the Mississippi, but there was little commerce up stream, owing to the difficulty of making headway against the current. It was cheaper and easier to abandon the rough rafts on which the goods were floated down than to bring them back again. But when the steamboat came these conditions changed. The first steamboat to ply on the Mississippi began its trips in 1811, but not until six years later did a steamboat find its way as far north as Saint Louis. Boats of the new pattern multiplied rapidly, and by 1835 there were no fewer than 230 engaged in traffic up and down the river, and the number continued to grow. There were skins and lumber from the far north, grains and other farm products from the central region, and coal from that section served by the Ohio—all to be sent down the river; while the South sent back to the North its cotton, its fruit and its sugar cane.

Cities sprang up along the banks: Minneapolis and Saint Paul, Winona, La Crosse, Keokuk, Dubuque, Davenport, Rock Island, Burlington, Quincy, Saint Louis, Cairo, Memphis, Vicksburg, Baton Rouge and New Orleans; and river navigation became a great science. It had its dangers—many of them—and a surprisingly large number of boats were lost. Fire destroyed many, and snags and rocks many more. Life on the river, largely because of this element of danger, became the great adventure to the dwellers on its banks, and to be a river-pilot was the supreme ambition of many a boy. Mark Twain had it with the rest, and was able to gratify it; and of his impressions he has written most interestingly in *Life on the Mississippi*.

From 1860 to 1885 was the great period of river commerce. Since the latter date there has been a steady decline, and in recent years not more than one-sixth as many boats ply the river as were to be found there in 1860. Many of the river ports are still busy and active, but more of them have lost the pleasant bustle which made their riversides alive. The great floating palaces, a trip on which was at one time looked upon as the height of luxury, no longer exist, and the occasional pleasure boats are not crowded with passengers as in the old days. The change has come largely with the increased mileage and efficiency of the railroads, but the uncertainty and irregularity inseparable from river navigation have done their part.

In very recent times a return of the lost activity has been prophesied. More than one city is improving its docks, and companies have been formed for the construction of great river barges. If all that these signs foretell comes

true, the "Father of Waters" may see restored the period of romance and of glory. J.R.

Consult Chambers' *The Mississippi River and Its Wonderful Valley;* Shea's *Discovery and Exploration of the Mississippi Valley.*

MISSISSIPPI SCHEME, known also as the "Mississippi Bubble," a gigantic financial scheme projected in Paris in 1717 by John Law, a Scotchman. The object of this experiment was to secure money for France to pay war debts and other national obligations which followed upon the reign of Louis XIV. The system, as stated by Law, was to create and formulate a vast association for trade, to be known as the Mississippi Company. The French government granted to the company the territory of Louisiana, then an indefinite region, and also lent its credit to the bank. The company was incorporated in 1717, and 200,000 shares were placed on the market and eagerly purchased, the people of France going wild in a fever of speculation. It was claimed that mountains of gold and precious stones had been found, and the shares of the association rose to fabulous prices. The inflated scheme, which was to make everybody happy and rich, collapsed in July, 1720, when the bank stopped payment and Law was compelled to flee from the country, while the investors found themselves facing financial ruin. See LAW, JOHN.

MISSOULA, *mi zoo' la,* MONT., the county seat of Missoula County and a distributing point of importance in its territory. It is in the western part of the state, midway between the northern and southern state lines, and on the Missoula River. Helena, the state capital, is 120 miles east and south, Butte is 120 miles southeast, and Spokane, Wash., is 257 miles northwest. Railway transportation is provided by the Northern Pacific and the Chicago, Milwaukee & Saint Paul railways. Missoula was founded in 1864 and was incorporated in 1884; it was the first city in Montana to adopt the commission form of government (1910). In that year the population was 12,869; in 1916 it was 18,214 (Federal estimate). The area of the city exceeds four square miles.

Missoula is the commercial outlet of Bitter Root Valley, by irrigation made beautiful and productive of agricultural produce, especially fruits and grains. The industries of the city are dependent upon the agricultural, lumber and mining resources of the locality. Large shipments of the finest fruit of the Northwest, grain, hay, lumber, wool and live stock, are sent from this point, and its lumber mills employ over 1,000 men. Missoula has a $175,000 Federal building; a courthouse, erected at a cost of $205,000; a Masonic Temple; a Knights of Pythias Building; Saint Patrick's Hospital, one of the best-equipped institutions of its kind in the West, and the Northern Pacific Railway Hospital. The University of Montana, Academy of the Sacred Heart, Roman Catholic high school for boys and the Missoula Business and Normal College, offer educational advantages, in addition to the public schools. In the vicinity is Fort Missoula, a United States military post.

The name *Missoula* was given to the settlement by the Flathead tribe of Indians, and means *at the water of ambush;* here, at the entrance to Hell Gate Cañon, behind rocks and willows, the Indians were accustomed to attack the enemy. Throughout the state, however, Missoula is known as the *Garden City,* because of its rich gardens and abundance of flowers. On account of its mountain scenery, its location on the National Parks Highway and the many trout streams in the vicinity, it is rapidly growing in popularity as a resort for tourists.

THE STORY OF MISSOURI

MISSOURI, *mi soo' ri,* or *mi zoo' ri,* a state of the west-central group of the American Union, rich in natural resources and occupying a conspicuous position in the trade, industry and progress of the country. Lying in the fertile Mississippi basin, the state has agricultural resources of vast extent, but these are not its only source of wealth. The Ozark and Iron

mountains are rich in minerals, and the forests of the south furnish a considerable part of the hardwood supply of the country. With the junction of the two greatest rivers of the United States on its eastern border, and situated in the heart of the agricultural and stock-raising country, Missouri has become an industrial and commercial center of great importance.

The state is named for its great river, which the Indians called the Missouri, meaning *Muddy Water*. It is popularly known as the *Bullion State* from the nickname, *Old Bullion*, applied to Senator Thomas Hart Benton of Missouri, that ardent friend of Western interests and supporter of gold and silver currency. Like several of the other states of the Union, Missouri has chosen the North American goldenrod as its flower emblem.

Size and Location. Ranking thirteenth in size among the states of the Union, Missouri has an area of 69,420 square miles, of which 750 square miles are water surface. The state is slightly smaller than Oklahoma, but larger than the total area of all of the New England states, with Delaware added; it is over three times the size of Nova Scotia and about one-tenth that of Quebec.

Missouri lies about midway between the Atlantic Ocean and the Rocky Mountains, and British America and the Gulf of Mexico. Added to the advantage of this central position, is the fact that it is bordered by eight states, a greater number than touch any other state in the Union but Tennessee. The entire eastern boundary is formed by the greatest of the country's rivers—the Mississippi; the Missouri, its mightiest tributary, crosses almost through the center of the state and forms the northern part of the western boundary.

The People. The earliest settlers of Missouri were the Spanish and French, but the present native population is largely descended from the emigrants from Kentucky, Tennessee, North Carolina and Virginia. In the last twenty-five years the population has increased over twenty per cent. The Germans are by far the most numerous of foreigners, but there are also many Irish, Russian and English immigrants in the state.

In 1910, having 3,293,335 inhabitants, Missouri ranked seventh in population among the states. The estimated population January 1, 1917, was 3,420,143. There are over 160,000 negroes in the state, who enjoy many of the privileges of the Northern negro, but are less ambitious and assertive. They form a large part of the laboring class, and many are in domestic service. About forty-three per cent of the inhabitants live in cities, the largest of which is Saint Louis, which ranks fourth in population among the great cities of the Union. Kansas City, Saint Joseph, Springfield, Joplin, Hannibal, Sedalia, Jefferson City, the capital, Webb City and Moberly are among the other important cities.

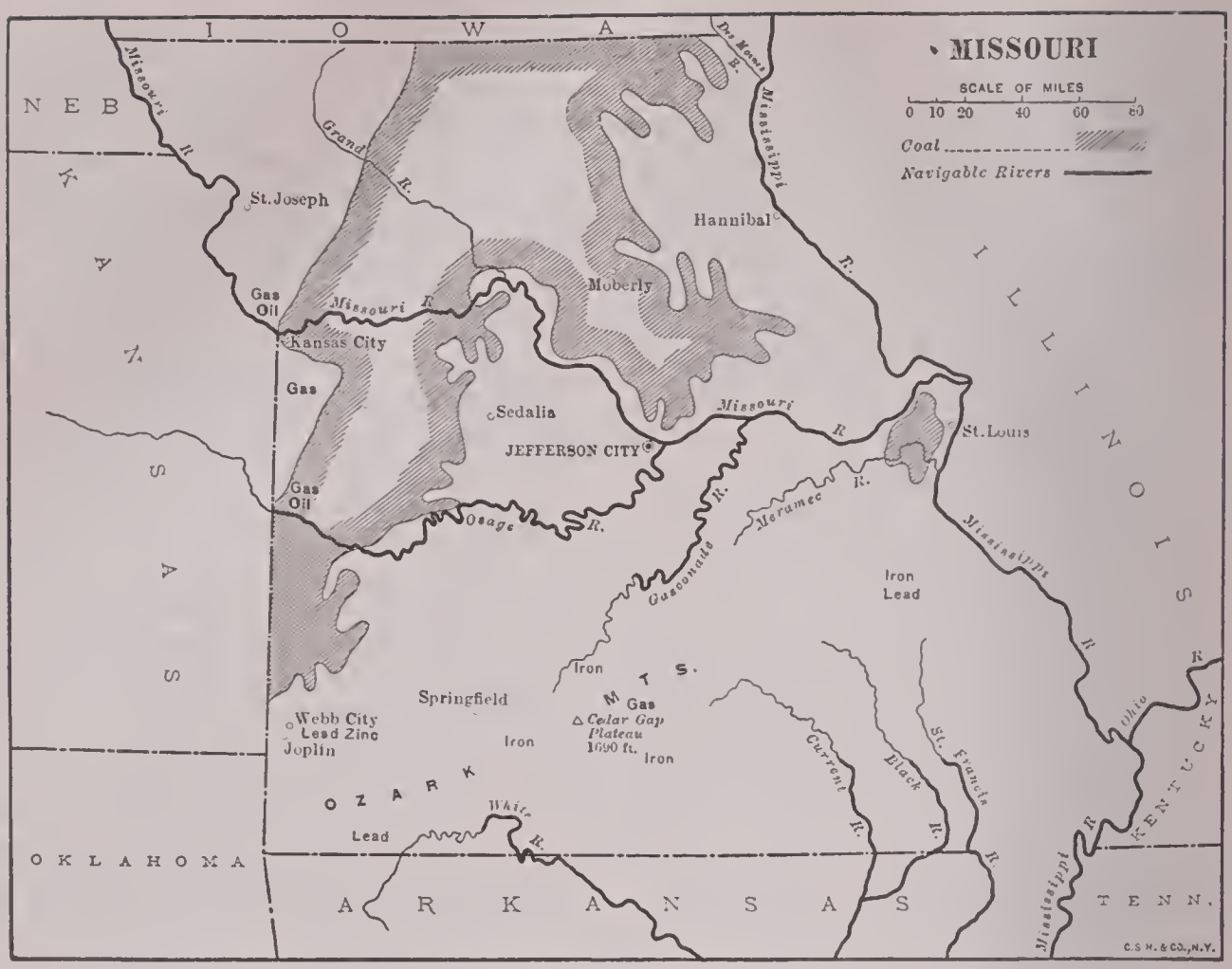
The Baptist, Methodist and Roman Catholic denominations are the largest religious bodies. The Church of the Disciples of Christ has recently shown the greatest increase in members, and the Presbyterian, Lutheran, Episcopal and Congregational bodies are also prominent.

Education. Although the illiteracy of Missouri averages higher than that of the other states in the west north-central group, it is less than that of any of the states which have as large a negro population, and is exceeded in all the west south-central states as well as in the east south-central and south Atlantic groups. There is an excellent system of public schools, controlled by the state superintendent of public instruction and the state board of education, which is composed of the superintendent of schools, the governor, secretary of state and attorney-general.

Free separate schools for white and colored children are required by law for every district, and attendance is compulsory for all between the ages of six and fourteen years. Agricultural instruction is given in the high schools, and in 1914 an extra appropriation was made for rural high schools and seven junior colleges, specializing in technical or undergraduate courses. Graduates from these junior colleges are admitted to the third-year class in the university.

The state maintains normal schools at Cape Girardeau, Kirksville, Warrensburg, Springfield and Maryville. In 1915, $200,000 was given by the state to erect a library with a capacity for 210,000 volumes, at the state university at Columbia (see MISSOURI, UNIVERSITY OF).

The private coeducational colleges in the state include: Washington University at Saint Louis; Missouri Wesleyan College at Cameron; Christian University at Canton; Central College at Fayette; Pritchett College at Glasgow; Missouri Valley College at Marshall; Drury College at Springfield; Park College at Parksville; Wesleyan College at Warrenton; Tarkio College at Tarkio; Scarritt-Morrisville College at Morrisville; William Jewell College (Baptist) at Liberty. There are also numerous sepa-



OUTLINE MAP OF MISSOURI

Showing the boundaries, navigable rivers, principal cities, coal deposits, lead, iron, zinc, gas and oil locations, and the highest point of land in the state.

rate institutions of higher learning for men and women.

In the Missouri Botanical Garden in Saint Louis, the finest garden of its kind in the United States, much field survey and important research work is being done.

Institutions. Missouri is conspicuous for its liberal provision for the poor and defective classes. The institutions of charity and correction are controlled by a state board and include: hospitals at Fulton, Saint Joseph, Nevada and Farmington; a colony for epileptics and the feeble-minded at Marshall; a school for deaf at Fulton; an institution for the blind at Saint Louis; an industrial school for boys at Boonville; an industrial school for girls at Higginsville; a Federal soldiers' home at Saint James; a penitentiary at Jefferson City. In 1913 contract labor was abolished and more humane prison conditions and regulations were introduced, and in the following year a state board of pardons and paroles was created. Funds have been appropriated for an industrial school for negro girls and mothers' pensions. The child welfare work in the state was reorganized in 1915, and in the same year the state legislature was empowered to provide by law for the pensioning of the deserving blind.

Missouri brought itself to the front rank in the country-wide fight against tuberculosis by providing for state-aided county tubercular hospitals in addition to the state sanatorium at Mount Vernon. Provision was also made for the suppression of dust and the employment of visiting nurses by county and city courts. The total value of state property devoted to charitable institutions exceeds $1,670,000,000.

The Land. Within Missouri one finds widely diversified and picturesque landscape. In the north and northwest sections of the state there are fertile, undulating prairies and fields of deep, rich soil. On the west, these merge into the higher grassy plains of the interior, and these great pasture lands in turn rise to the rough slopes of the Ozarks and Saint François mountains in the southwest and south. These mountains form one of the most beautiful scenic regions in the Mississippi Valley. Between the knoblike peaks are deep, narrow valleys in whose depths lie hidden streams and

mysterious caves. The attractive scenery, healthful climate and medicinal springs of the region have made it one of the most popular resorts of the Middle West. Among the well-known mineral watering places are Excelsior, Pertle and Sweet springs.

The extreme southwestern corner of the state is a wooded table-land, and in the southeastern section there are fertile lowlands, dotted with many swamps, shallow lakes and deep forests. In 1914 a land reclamation act was passed providing for the drainage and cultivation of these southern swamp lands.

Rivers and Lakes. Although there are no large lakes, Missouri ranks first among the states in the extent of navigable rivers, and to these the state owes much of its industrial and commercial importance. With the Mississippi, that great central artery of the river traffic of Central United States, extending the length of its eastern border, and crossed by the swift Missouri, the second river of the country, Missouri has become the center of the river traffic of the West-Central states. The Wyaconda and Salt rivers, draining the northeastern section; the Meramec, rising in the Ozarks; and the Saint Francis, forming the western boundary of the southern strip of the state, are other important affluents of the "Father of Waters." The Missouri is also fed by many large tributaries, among which are the Platte, Grande Chariton, Osage, Gasconade and Lamine. The White and Black rivers, entering the southwest mountain region, are tributary to the Arkansas.

Climate. Lying far from the moderating influence of the sea and the Great Lakes, Missouri has a climate marked by extremes of heat and cold. The Ozark Mountains, though affecting the temperature locally, are not high enough to afford protection to the whole state from the west winds. In the summer months, the mountains offer the only relief from the heat of the prairies and lowlands. During some winters, the temperature rarely falls below zero and only once in four or five years does the Mississippi at Saint Louis freeze over; even then it is partly due to the floating ice from the north. The Missouri, however, is often closed by ice during the winter months. The average temperature is 33° in winter and in the summer 77°. The rainfall, ranging from thirty-five inches in the north to fifty inches on the southern border, is abundant in all parts of the state.

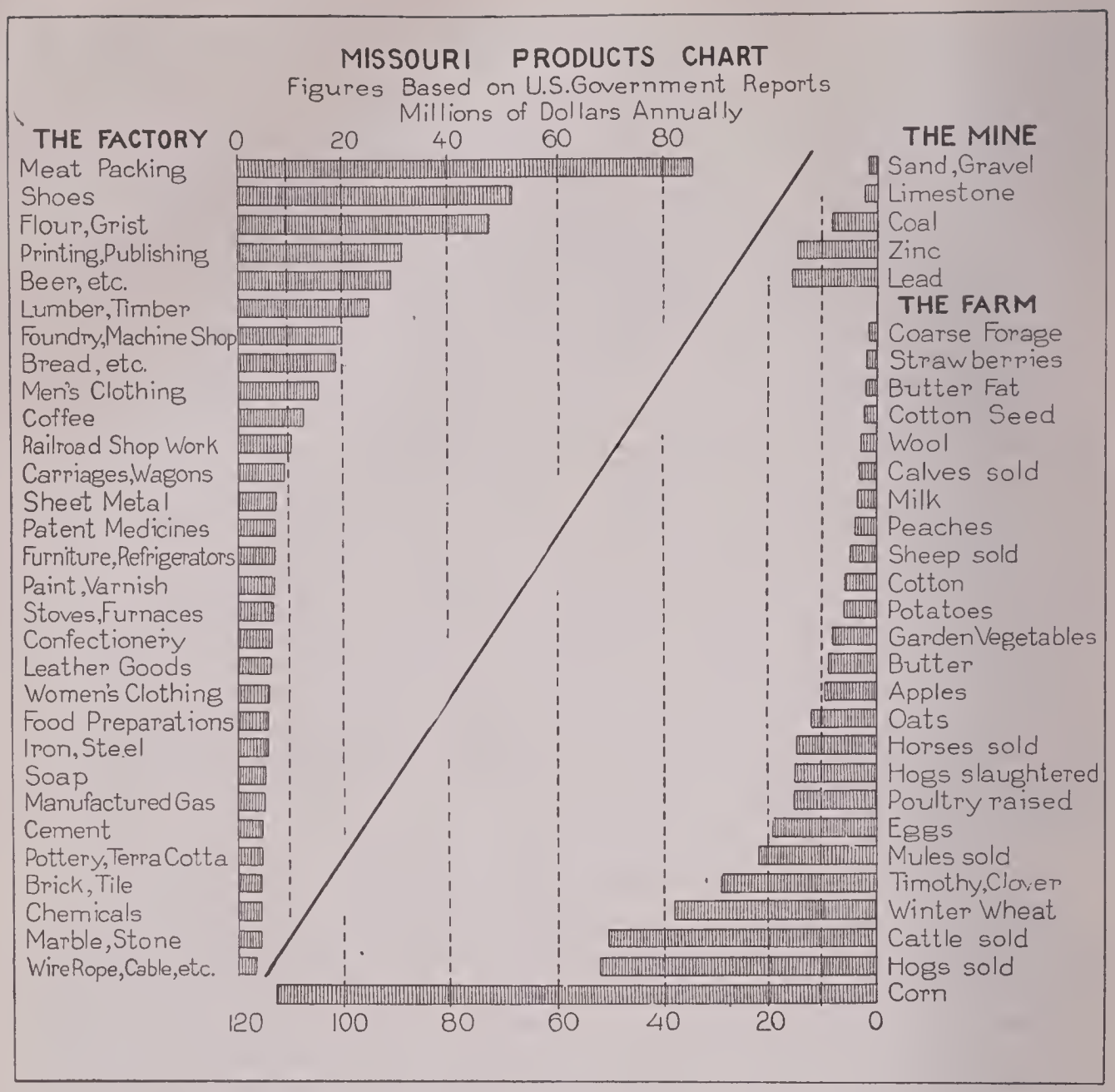
Resources and Industry

Agriculture. The diversified character of the surface and soil makes it possible to grow many kinds of crops in the state, and according to the last official census Missouri ranks sixth among the states in the value of crops. The cereals, grown chiefly in the well-watered fields of the north and northwest sections, are the chief crops. Corn is the most important of these, and in its production Missouri closely follows Nebraska, a state which is surpassed only by Illinois and Iowa. In 1915 the output of corn was 209,450,000 bushels, valued at $119,386,000. Wheat is second in importance and the average production is well over 30,000,000 bushels. Missouri wheat is of an especially fine variety and the flour made from it is in high demand in both domestic and foreign markets. Potatoes, sorghum, hay, oats, rye and tobacco are other large crops, and cotton is raised in the southeastern section.

All varieties of fruit can be successfully cultivated and are of a fine quality. Apples and peaches grow in all parts of the state, and in addition to these and other Northern fruits, as the pear, plum and cherry, the more tender fruits, such as nectarines and apricots, are grown. Small fruits are important, and Missouri leads all of the states in the production of blackberries and dewberries. There are many varieties of cultivated grapes, and six native kinds are found in luxuriant growth; no state, not even California, surpasses Missouri in the quality of its red and white wines.

More than three-fourths of the approximate land area is in farms, and over one-half of the total area is improved land. In 1915 the state provided for a state land bank to loan money on farm lands up to fifty per cent of their value for five to twenty years.

Stock Raising. The central prairies, covered with blue grass, timothy, and red and white clover, are especially suited to fine stock raising; Missouri ranks among the leading live-stock states. In the raising of mules the state is surpassed only by Texas. Missouri mules are known everywhere for their superior quality. The cheapness of Indian corn and the proximity of the great markets at Kansas City and Saint Joseph make the raising of hogs and cattle especially profitable in the northwest, and in the production of swine Missouri is about on a par with Illinois, which is sur-



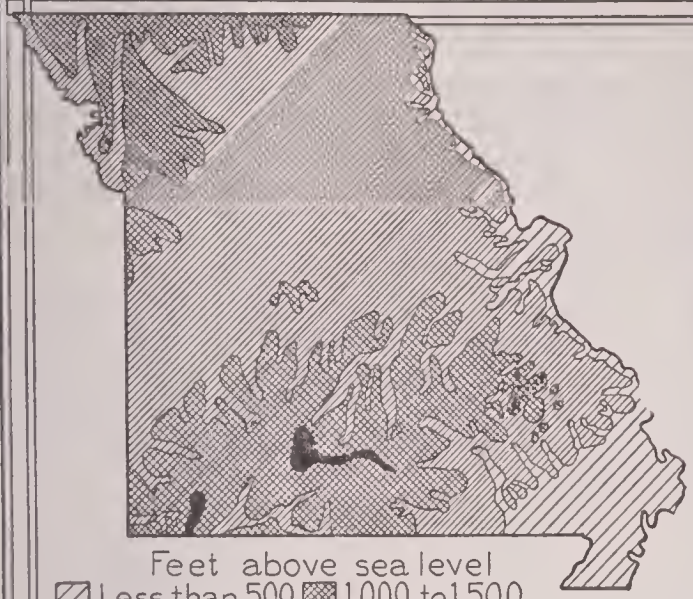
passed only by Iowa. In 1914 the state constructed one of the largest hog serum plants in the country. Sheep raising is carried on extensively in the grassy uplands of the south, and in the horse markets Missouri is noted for its fine, blooded stock. In 1916 the total value of the live stock in the state was $267,504,000.

Forests. Over forty per cent of the total area of the state is timberland, and the lumber industry gives employment to a greater number than any other industry but the boot-and-shoe manufactures. The hardwoods of the Ozark region furnish the most valuable lumber. Cedars are found in the eastern section, and swamps of cypress border the southeastern rivers. The total value of the lumber products of the state exceeds $8,400,000 annually.

Minerals. Although an agricultural state, Missouri has vast mineral wealth and leads all of the other states of the Union in the production of zinc, lead, tripoli and barytes. The great lead mines of southeastern Missouri, especially those in Saint François and Madison counties, recently have shown a greater development than any other lead-producing district in the United States, and since 1908 have surpassed the Coeur d'Alene district in Idaho, formerly the leading lead region in the Union. The lead product, which exceeds $15,000,000 in value, together with the zinc, the value of which is over $10,000,000, forms over one-half of the entire mineral output of the state. The great zinc industry in the mountainous region in the southwest has caused the rapid growth of Joplin and of Webb City.

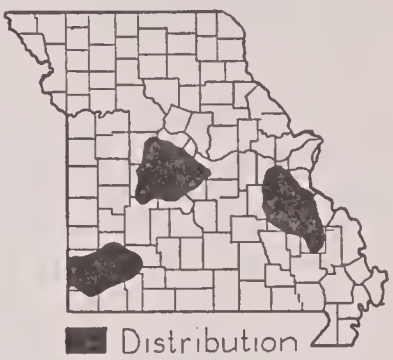
Missouri's coal fields in the northwestern part of the state cover over 23,000 square miles and are continuations of the coal deposits in Kansas and Iowa. This state was the first of those west of the Mississippi to mine coal, but owing

MISSOURI



Feet above sea level
Less than 500
500 to 1,000
1,000 to 1,500
Over 1,500

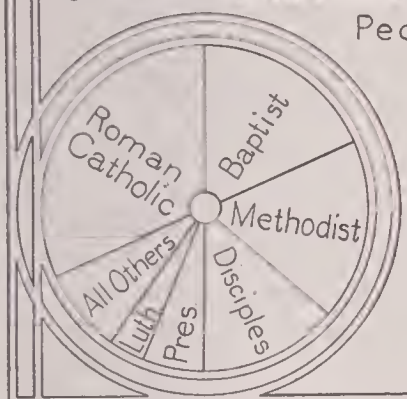
Home of "Huckleberry Finn," Hannibal



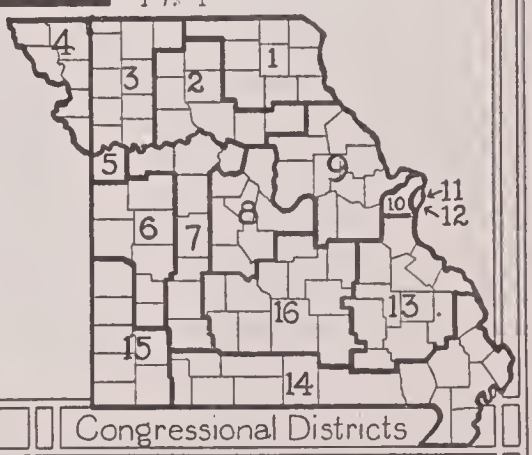
Distribution of lead and zinc

1850 — 9.8
1860 — 17.
1870 — 25.
1880 — 31.2
1890 — 38.6
1900 — 44.7
1910 — 47.4

People per square mile by decades

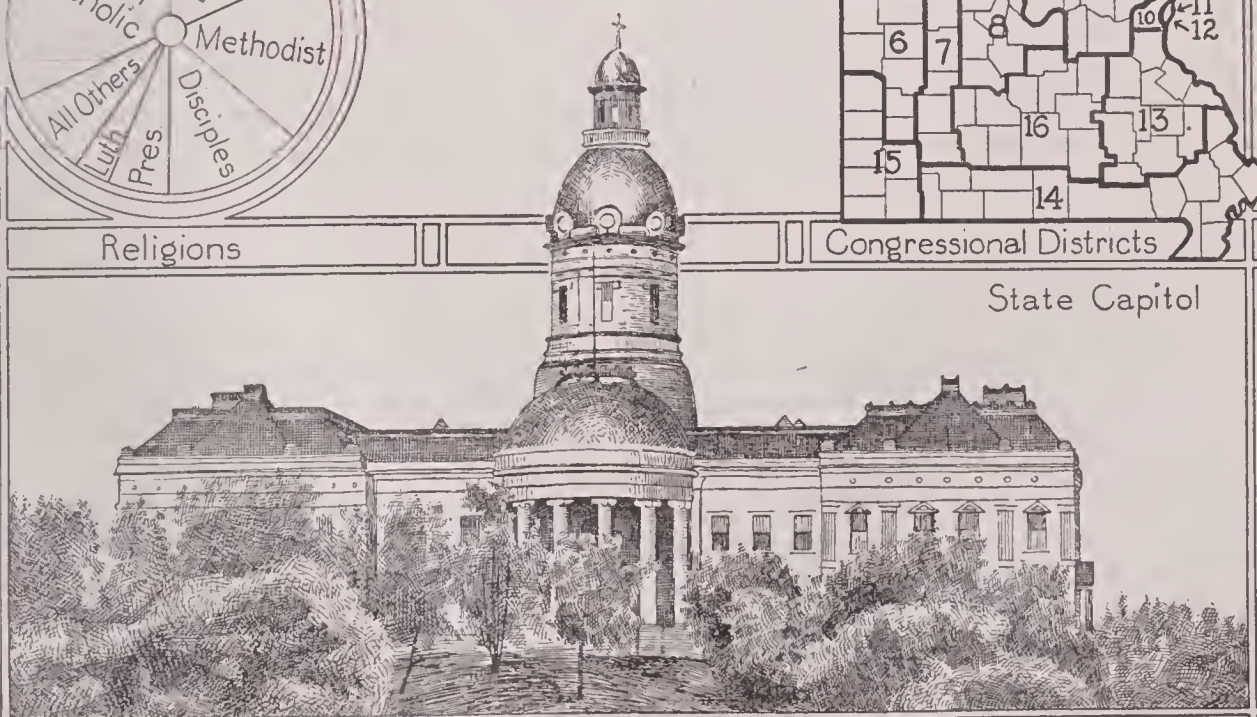


Religions



Congressional Districts

State Capitol



to the recent development of the fields in Kansas and Oklahoma the output is not of great importance in the country's production. However, coal mining ranks third among the mineral industries of the state; over 10,000 miners are employed and the average output exceeds 3,500,000 long tons. It is estimated that the available supply is 83,820,000,000 tons. Clay products, especially fire brick, are fourth in importance. Portland cement is also among the chief mineral products, the average annual output exceeding $4,500,000 in value. Other minerals found in considerable quantities are copper, nickel, cobalt, silver, iron, granite, limestone, sandstone and fine sand used in the manufacture of glass. Iron Mountain is said to be the largest known mass of pure iron in the world. The average annual income from the mineral products of the state exceeds $54,000,000.

Laws have been passed requiring safe and sanitary conditions in the mines, insurance against industrial dangers such as lead poisoning, and restricting the labor in silica and glass-works to eight hours a day.

Manufactures. Besides these large agricultural and mineral interests, Missouri has many and important manufacturing industries. The industrial prominence of the state is largely due to its central location, excellent facilities for transportation and abundance of raw materials and fuel. Saint Louis, the chief industrial center of the state, ranks fourth among the manufacturing cities of the Union, and Kansas City and Saint Joseph are also centers of varied and important branches of trade. The leading industry of the state, when measured by the value of products, is slaughtering and meat packing, though others exceed it in number. The largest stockyards are at South Saint Joseph. Missouri is surpassed only by Massachusetts in the manufacture of boots and shoes, which also ranks as the second industry in the state. This has been of comparatively recent development, increasing over 325 per cent between 1900 and 1910. The chief shoe manufactories are located at Saint Louis, but the shoe-making industry is by no means confined to that city, for it has spread to many of the small cities and towns.

Third in importance are flour mill and grist-mill products. Besides the large mills in the cities, many small mills are located in the rural districts. Other large industries in the order of their importance are: printing and publishing; the brewing of liquors; the manufacture of lumber and timber products; foundry and machine shop work; the manufacture of clothing; the roasting and grinding of coffee and spice; the manufacture of bakery products, railroad cars, pipes and tobacco. The smelting and blast furnaces, the manufacture of glass, paints and pottery and marble and stone work are important, and the manufacture of smoking pipes is a distinctive industry of the state. Missouri now ranks among the first ten manufacturing states of the Union, the annual value of its products being about $575,000,000.

Laws were passed by the state in 1913, limiting female labor in factories to fifty-four hours per week, protecting trade unions and abolishing trusts. In 1915 further industrial legislation provided for safety precautions in large establishments.

Transportation and Commerce. Transportation facilities are especially excellent in Missouri, for besides having more navigable rivers than any other state, it has exceptional railroad accommodations. Although there is still much river traffic on the Mississippi between Saint Louis and the Gulf, the railroads have furnished cheaper and faster transportation for much of the trade formerly carried by river boats. Since the use of railroad transportation, the trade in cotton especially has increased, and Saint Louis has become one of the leading cotton markets in the Union; having railroad connection with all parts of the country, it is a distributing point for many other products. A network of railroads extends over the northern section of the state and many trunk lines cross the state to the south and west. The chief roads are: the Missouri Pacific; Atchison, Topeka & Santa Fe; Saint Louis & San Francisco; Kansas City Southern; Chicago, Burlington & Quincy; Chicago & Alton; Wabash; Missouri, Kansas & Texas. The total mileage of steam roads exceeds 8,100 miles, and the electric roads, of which there are over 800 miles, are continually being extended. The railroads of the state are regulated by a board of railroad commissioners. In 1915 Missouri passed safety laws abolishing railroad grade crossings in cities and regulating the lighting and protecting of all crossings.

Missouri is taking an active part in the country-wide campaign for good highways, and many of the notoriously muddy roads of the state are being improved. There are over 8,000 miles of surfaced roads, and the state is crossed by the Jefferson Highway, extending from New Orleans to Canada.

RESEARCH QUESTIONS ON MISSOURI

(An Outline suitable for Missouri will be found with the article "State.")

What does the name of the state mean? What is its popular name, and how did it receive it?

How many states have the same state flower as Missouri?

What special distinction has the state with reference to the two greatest rivers of the country?

How many states have a greater area? What state closely resembles it in size?

How many states border upon Missouri? What other states have as great a number bordering upon them?

What is the average number of inhabitants to the square mile? Is this larger or smaller than the average for the country as a whole?

How many states have a larger population? Do all of these exceed Missouri in area, as well?

Which would you rather have, a year's yield of the forests or a year's yield of the zinc mines?

How does Missouri's largest city rank in size among great cities of the country?

What do the illiteracy statistics of this state tell about the intellectual condition of its negro inhabitants?

What has the state done in the fight against tuberculosis?

Where is Missouri's chief scenic region?

What has been done toward making a certain section of the state more healthful as well as more productive?

What natural advantage has this state over others in the matter of transportation?

Why does this state have a distinctly "continental climate"—one marked by extremes of heat and cold?

How many states rank above Missouri in value of total crops? In value of its chief crop?

In what one of California's most important products does Missouri rival that state?

How, besides in the matter of education, does the state help the farmer?

Why is the northwestern part of the state particularly well suited to the raising of hogs and cattle?

What two cities have profited by the growth of one of the chief mining industries?

Of what two minerals does this state produce more than any other state?

Why does the coal production of Missouri no longer possess the importance it once did?

Describe Missouri's great mass of pure iron.

What remarkable development did the second manufacturing industry of the state make during one decade?

Why is river navigation no longer of such great importance as it once was?

How many constitutions has the state had? How long has it been governed under its present one?

What famous legislation of Congress took its name from this territory? What did this legislation accomplish?

What part did the state play in the War of Secession?

Government and History

Government. The constitution under which the state is now governed is its third, and was adopted in 1875. Amendments may be proposed by a majority vote in each house of the legislature, and are then submitted to the popular vote at the next general election.

Executive Department. The governor, lieutenant-governor, secretary of state, treasurer, state auditor, attorney-general and superintendent of public instruction, all elected for terms of four years, are the executive officers of the state.

Legislative Department. The law-making body, or general assembly, is composed of a senate of thirty-four members, elected for three years, and a house of representatives of 142 members, chosen every two years and apportioned according to the population of counties. Missouri abolished the death penalty in 1917.

Judiciary. The judicial department consists of a supreme court, a court of appeals, circuit and inferior courts. All of the judges are elected by the people.

In 1913 juvenile courts were extended to all counties. In this same year the initiative and referendum were established; a law was also enacted providing for the nonpartisanship of judges. Municipal home rule has been granted to cities having a population of over 100,000, and the commission form of government may also be adopted in cities and towns. Missouri has enacted particularly harsh laws aiming at the control of corporations. The liquor traffic is controlled by local option laws.

Exploration and Settlement. Before the coming of the white man, Missouri was occupied by the Shawnee, Osage, Missouri and Mandan Indians. Although De Soto explored the Missouri in 1541, and Marquette and La Salle passed its banks on the Mississippi in 1673, the territory remained in the hands of the Indians until 1682, when La Salle took possession of it as a part of the French territory of Louisiana.

The French explored the interior and made the first settlements at Sainte Genevieve and New Bourbon. The site of Saint Louis was chosen by Pierre Laclede Liguest in 1763, and in the next year Auguste Chouteau began the building of the village. For many years the settlements were confined to the neighborhood of the river. The ownership of all of the territory west of the Mississippi was transferred to Spain in 1763 by the Treaty of Paris, but in 1800 it was ceded back to France.

The territory of Louisiana, of which Missouri was a part, was purchased from France by the United States in 1803. The northern section of this region, called Upper Louisiana, was occupied by the government in 1804, and eight years later was organized as the Territory of Missouri.

As a United States Territory. At the time of its organization as a territory, Missouri had a population of over 20,000, and the agricultural and mining industries were already supplanting the fur trade. Being on the southern boundary of the Northern states and settled by many Southerners, Missouri was a point of bitter contention in the slavery question. When, in 1818, the territory asked admission into the Union, the nation-wide controversy arose which was not settled until 1820, when Henry Clay offered the famous bill known as the Missouri Compromise. Upon its terms Missouri was admitted as a slave state on July 19, 1820. The capital of the new state was at Saint Charles, but six years later it was moved to Jefferson City, which is more centrally located.

Statehood. The first census of the state, taken in 1821, showed the population to be 70,647, of which number 11,254 were slaves. Missouri was again involved in slavery difficulties at the time of the settlement of Kansas.

In 1861, although Governor Jackson and many in the legislature favored secession, the majority in the state convention were opposed to the Confederacy. The people were about equally divided in sentiment, and often members of the same family joined opposing forces. The governor, who had fled from the capital, summoned troops for the Confederacy and they assembled in large numbers in the southwestern part of the state. In a battle near Springfield they defeated the Union troops, and as a result General Fremont, commander of the West, declared martial law throughout the state. In 1862 the Confederates under General Price held half of the state, but were later driven into Arkansas by General Curtis. Price, who returned to the state in 1864, was finally defeated, after which there was little fighting of importance in Missouri.

In 1865 a new constitution was adopted, and four years later the Fifteenth Amendment to the United States Constitution was accepted. Since 1875 the state has enjoyed wonderful prosperity, and it is now among the leading states in the Union in population, trade, indus-

try and agricultural and mineral wealth. Missouri has had but two Republican governors, those whose terms began in 1865 and 1909. The state was prominent in the Presidential campaign of 1912, furnishing one of the candidates for the nomination, Champ Clark, then Speaker of the House of Representatives. The war against corporations, begun in 1908, and later industrial, social and judicial legislation have also added to Missouri's prominence. E.B.P.

Consult Carr's *Missouri,* in American Commonwealth Series; Rader's *History of Missouri from the Earliest Times to the Present.*

Related Subjects. The following articles in these volumes contain much that will be of interest in connection with a study of Missouri:

CITIES

Cape Girardeau
Columbia
Hannibal
Independence
Jefferson City
Joplin
Kansas City
Moberly
Saint Charles
Saint Joseph
Saint Louis
Sedalia
Springfield
Webb City

HISTORY

La Salle, Sieur de
Louisiana Purchase
Missouri Compromise
War of Secession

LEADING PRODUCTS

Apple
Blackberry
Boots and Shoes
Cattle
Cow
Hog
Lead
Lumber
Meat and Meat Packing
Mule
Peach
Wheat
Wine
Zinc

MOUNTAINS

Iron Mountain
Ozark

RIVERS

Mississippi
Missouri
Platte
White

MISSOURI, UNIVERSITY OF, a coeducational institution, founded at Columbia in 1839, and now organized into a college of arts and sciences, a college of agriculture, schools of commerce, education, engineering, journalism, law, medicine, mines and metallurgy, the graduate school and the extension division. Experiment stations are maintained in connection with the departments of agriculture and engineering. The university organized the first school of journalism in the world and the first school of education in any state university. All of the university divisions, with the exception of the school of mines and metallurgy, which is at Rolla, are located at Columbia. The campus at Columbia contains about seventy acres and that at Rolla, twenty-seven. The university also owns a farm of nearly 800 acres.

The equipment of the institution, which is valued at over $3,646,000, includes a library of nearly 200,000 volumes and 100,000 pamphlets. The regular enrolment is over 3,800, but the summer session attracts in addition about 1,300 students of university grade. The distinguishing feature of the state university of Missouri is the emphasis which it places on what is fundamentally the most practical.

MISSOURI COMPROMISE, *kom'pro mize,* one of the most important measures ever passed by the Congress of the United States, introduced by Senator Jesse B. Thomas of Illinois, and approved by President Monroe in March, 1820. The most important provisions of the measure were the following:

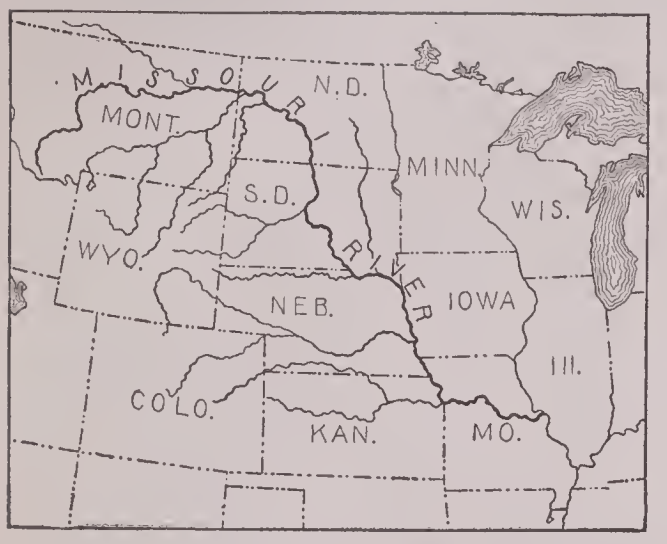
> Missouri shall be admitted into the Union as a slave state, but slavery shall be forever prohibited north of the southern boundary of Missouri; namely, 36° 30′ north latitude.

The Missouri Compromise was the culmination of one of the early battles between the slavery and antislavery factions. In the year 1819 both Maine and Missouri applied for admission into the Union. Maine had already adopted a constitution prohibiting slavery, and as up to that time the number of free and slave states had remained equal, the Southern leaders in Congress refused to admit Maine free unless Missouri should be admitted with slavery. Both sides accepted the compromise as a satisfactory solution of the problem, and by a separate bill Maine came into the Union as a free state.

The admission of Missouri, however, was delayed until 1821, as some of the provisions of its constitution were objectionable to the North. Henry Clay, whose support of the act of 1820 won him the title "the Great Pacificator," was also influential in securing the second compromise by which Missouri was admitted into the sisterhood of states. The Missouri Compromise, which remained in force until repealed by the Kansas-Nebraska Bill of 1854, was the first act in American history which by law divided the North into free, and the South into slave, territory.

MISSOURI RIVER, a river of the United States which forms part of the longest river system in the world; for while it is usually described as a tributary of the Mississippi, it is in effect part of that great stream. From its source to its junction with the Mississippi it is 2,945 miles long, while the length of the combined rivers from the source of the Missouri to the mouth of the Mississippi is 4,200 miles—a length which no other river in the world approaches.

Its Course. High in the slopes of the Rocky Mountains rise three rapid rivers, two of them having their source within Yellowstone Park. These are the Jefferson, the Madison and the Gallatin, and they all unite at Gallatin City, Mont., 4,032 feet above sea level, to form the Missouri. A rushing stream, almost a torrent here in its upper stretches, it hurries through the Gate of the Rockies, a deep, steep-sided gorge; leaps the cataracts at Great Falls, and flowing first north, then east, makes its way



THE MISSOURI RIVER

Almost 3,000 miles in length, this stream and its tributaries affect nine great states, each an inland empire. (See, also, chart, page 3851.)

across Montana. Just as it enters North Dakota it is joined by its largest tributary, the Yellowstone, which rises in Yellowstone Park not far from the two source-streams of the Missouri.

Crossing North Dakota in a great curve, the river flows through South Dakota, divides Nebraska from Iowa and Missouri, forms the northeastern boundary of Kansas, and then, with an easterly trend, winds across Missouri. Twenty miles above Saint Louis it mingles its waters with those of the Mississippi, and sends its vast burden of sediment down toward the Gulf of Mexico. Every second, on an average, it pours out 120,000 cubic feet of water—twenty *cubic miles* in a year! And the silt which it carries down amounts in a year to 550,000 tons.

Its Influence on Geography. The drainage basin of the Missouri has an area of almost 600,000 square miles—very nearly half that of the entire Mississippi system; for into it flow, besides the Yellowstone mentioned above, the Cheyenne, the James, the White, the Big Sioux, the Platte, the Kansas and the Osage. Along its banks at intervals are busy and growing cities, whose location it has largely determined. There are Great Falls, built because of the abundance of water power furnished by the cataracts, Bismarck, Pierre, Sioux City, Omaha, Council Bluffs, Atchison, Leavenworth and Kansas City. When it reaches these latter cities, after its mountain course is past, the Missouri is a huge stream sometimes a mile or more in width. Here, however, as in its earlier stages, it is swift-flowing and turbid, its popular name, used half in affection by those who live on its banks, but in scorn by those who have no personal feeling for it, being the "Big Muddy."

The Missouri has not, like the Mississippi, built up a huge flood plain, but its course and the state of its channel have been largely determined by the amount of sediment it carries. Cutting through the mountains, it acquires vast stores of sand and gravel, and later, when the current is less rapid, it is forced to drop much of this. Its channel, therefore, is on a bed of silt which is in some places 125 feet deep. Sometimes, however, when the spring floods come, the river cuts through all this and flows on a rocky floor.

History. In 1673 Marquette and Joliet marked the spot where the Missouri emptied its muddy waters into the clearer Mississippi, and in the next century adventurous traders made their way up the river in search of furs. For a long, long time only canoes and such primitive boats were seen on its waters, and one of the interesting early sights was a band of thirty or forty men walking along the shore and dragging a boat upstream after it had carried down its cargo of furs.

But in 1819 the first steamboat made its way up the river, and the steamboats used by the fur companies played an important part in opening up the great northwestern region. Navigation was dangerous because of the sandbars and the snags, or submerged trees, but it was not this which led to the decline of river traffic after 1860. It was the railroads, which made special rates for riverside towns, and so got all the commerce. For about a half-century the river carried little merchandise, but since 1908 determined efforts have been made by the people of the river ports to increase the use of this great highway at their doors; they are aided by the fact that freight rates on railroads are now regulated by law, and no favoritism can be shown one city over another. Improvements have been projected and completed, consisting chiefly in the building of levees and the removal of snags, and there has already been a slight increase in river traffic.

The river is navigable to a point nearly 2,300 miles from its mouth, and, above Great Falls, for about 300 miles more, but the current is so rapid in these upper stretches that only flat-bottomed boats are practicable and safe.

MISTLETOE, *mis''l toh,* a small evergreen shrub of the mistletoe family, native to the greater part of Europe, and characterized by its habit of growing on the trunks of various trees (see PARASITE). Contrary to popular belief, the mistletoe is rarely found on the oak. Most commonly the apple tree serves as its host, but it also grows on the hawthorn, sycamore, lime, poplar, locust, fir and other trees. Its thickly-growing evergreen leaves and tiny yellow flowers give a pleasing touch to orchards in February and March, and its white, translucent berries are loved by the birds. By rubbing their bills, to which the seeds cling, against the bark of trees on which they alight, the birds help to propagate the plant.

The mistletoe is a plant of many traditions. Whenever the Druids, ancient priests of the Celts, found it growing on the sacred oak, they cut it off with a golden blade and gave bits to the people for charms. In Northern mythology it was an arrow made of mistletoe which slew

MISTLETOE

Balder, son of the goddess Frigga (see BALDER). Early European nations seem to have revered the mistletoe as a ceremonial plant, a practice which is the probable origin of the familiar Christmas custom of "kissing under the mistletoe."

MITCH'ELL, DONALD GRANT (1822-1908), an American novelist and essayist, better known under the name of IK MARVEL. He was born in Norwich, Conn., was graduated at Yale and pursued law studies in New York City. In 1853 he was appointed United States consul to Venice, but after two years settled at "Edgewood," his farm near New Haven, and occupied his time with literary work and with farming. While in Europe in 1848, he witnessed the revolution in Paris, which he described in his book entitled *The Battle Summer.* His best-known works are *Reveries of a Bachelor* and *Dream Life,* two volumes on which his fame largely rests, and *Dr. Johns, The Lorgnette* and *Wet Days at Edgewood.*

MITCHELL, JOHN (1869-), one of the most influential, active and trusted leaders in the organized labor movement in the United States. He was born in Braidwood, Ill., where he attended school until he was ten years of age. Later he studied law for a year, and also gained an extended knowledge of economic questions by private reading. When a boy of thirteen he became a coal miner, in 1885 he joined the Knights of Labor, and for the next five years worked and traveled in the West. In 1895 he became an officer of the United Mine Workers of America, served as president of the organization from 1899 to 1908, and made his influence felt by securing for the workmen better wages and an extension of the eight-hour law.

JOHN MITCHELL

The successful anthracite coal strikes of 1900 and 1902 were directed by Mitchell, who was then second vice-president of the American Federation of Labor, and he terminated the latter by agreeing to accept the decision of the arbitration committee appointed by President Roosevelt. In 1907 the Buck Stove and Range Company secured an injunction against the officers of the American Federation of Labor, because the members of that organization had been advised to boycott the products of the company. Since the blacklisting was not discontinued, Mitchell and his colleagues, Samuel Gompers and Frank Morrison, were found guilty of contempt of court and sentenced to a term of imprisonment. The case, however, was later dismissed by the Supreme Court.

In 1914 Governor Glynn of New York appointed Mitchell to the State Workmen's Compensation Board, and a year later he became a member of a new Industrial Commission which

superseded the board. Throughout his career he has been an advocate of the "square deal" on the part of labor unions. He has written *Organized Labor: Its Problems, Purposes, and Ideals;* and *The Wage Earner and His Problem.*

MITCHELL, Silas Weir (1829-1914), better known as S. Weir Mitchell, a notable American physician, who also achieved fame as a novelist and poet. He occupies a unique place in American letters in that he made use of his professional experiences in his literary work. He was born in Philadelphia, studied at the University of Pennsylvania and was graduated from Jefferson Medical College in 1850, beginning medical practice in his home city. During the War of Secession he was an army surgeon and assumed charge of soldiers suffering from nervous disorders, after which he developed the "rest cure" treatment which found world-wide favor among physicians. Before the close of the war Dr. Mitchell began to write stories for children, but until 1880 most of his publications were medical treatises. In that year he published the novels *Thee and Thou* and *Hephzibah Guinness,* and from that time wrote novels, stories and poems at regular intervals. His first popular success, *Hugh Wynne, Free Quaker,* published in 1897, is a story of the American Revolution, and is now considered one of the best historical novels of American literature. Other works include *Dr. North and His Friends, The Red City, Westways* and *The Comfort of the Hills.* His last novel, *John Sherwood, Ironmaster,* was published in 1911; in 1914, after his death, *Complete Poems* was published.

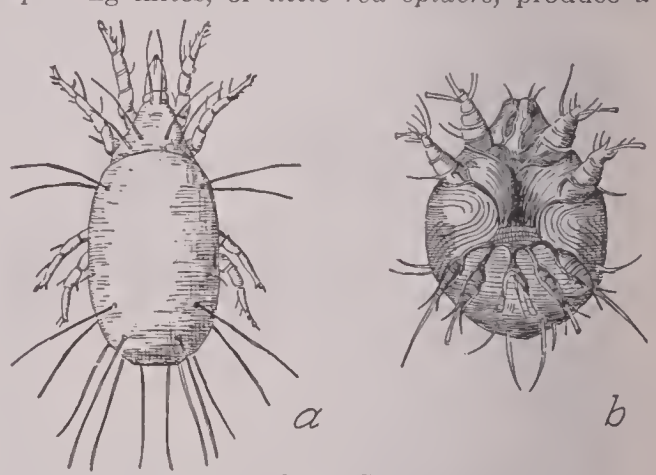
S. WEIR MITCHELL

MITCHELL, S. D., the county seat of Davison County, in the southeastern part of the state, sixty-seven miles west and north of Sioux Falls and seventy miles northwest of Yankton. It is on the James River and on the Chicago & North Western and the Chicago, Milwaukee & Saint Paul railroads. The population, 6,515 in 1910, was 7,785 in 1915, according to the state census.

Mitchell is the seat of the Dakota Wesleyan University (Methodist Episcopal). The buildings and institutions of the city include a Federal building, Carnegie Library, city hall, opera house and the Saint Joseph's and Methodist hospitals. The city is situated in an extensive, rapidly developing agricultural region and is an important shipping point for grain and live stock. The industrial enterprises include a creamery, grain elevators, lumber mills, railroad and machine shops and cigar and candy factories. There is a large wholesale trade in groceries, fruits, etc.

A corn palace is the principal feature of an annual fall festival which attracts many visitors. More than 2,000 bushels of corn are used each year in the exterior decoration of the building. The town was settled in 1879 and became a city in 1883. T.J.M.

MITES, numerous species of small insects, varying in size from tiny creatures almost invisible to the naked eye, to certain forms half an inch long. More than one-half are parasitic, at least during part of their lives; some are terrestrial or aquatic, and others live in cheese, sugar and flour (see Parasite). The body and legs are covered with bristles, hair or scales, which are characteristic in each species. The spinning mites, or *little red spiders,* produce a slender thread as they go, and the accumulated threads of many individuals make a whitish web. Another form, called *ticks,* infests animals, birds and snakes. Their mouths are formed for cutting into the skin and sucking the blood. This family produces the most injurious of all mites, namely, the *cattle tick,* which spreads disease among cattle. *Itch mites* burrow into the skin of man and animals. Formerly they were not uncommon, but cleanliness has largely destroyed them in the case of man. The majority of mites are injurious, but some are beneficial in destroying other insects, and thus are active in the preservation of plants. See Ticks.



MITES

(*a*) Cheese mite; (*b*) under side of the itch mite. The illustrations are greatly enlarged.

MITHRIDATES, *mith ri da' teez* (135-63 B. C.), king of Pontus, on the shore of the Black Sea in Asia Minor, who proclaimed himself Asia's deliverer from the yoke of the Romans. He ascended the throne at the age of thirteen, and became a man of remarkable genius and energy. Through him the fires of insurrection were kindled as far westward as Greece. To secure his power in Asia he ordered that on a certain day every Italian should be put to death, and the slaughter was variously estimated at from 80,000 to 150,000. After this barbarous act he sent an army into Greece, but after waging two wars was forced to make peace with Sulla, the Roman dictator. The third, and greatest, Mithridatic war broke out after the death of Sulla. Pompey became dictator, made an alliance with the king of Parthia and forced Mithridates into battle and drove him beyond the Caucasus Mountains. In spite of the loss of his kingdom the spirit of Mithridates was unbroken, and he began to plan an invasion of Italy, but his son Pharnaces rebelled against him and he died by poison, at his own hand.

MITHRIDATES
From a coin.

Mithridates was a friend of culture and the arts, and it is said he spoke more than twenty languages. He kept historians and poets at his court and gave prizes to the best singers. His death removed one of Rome's greatest enemies, his name being always pronounced by the Romans with respect and dread.

MOABITES, *mo' ab ites,* the name of a tribe of warlike people in Biblical times who lived in the territory at the southeastern end of the Dead Sea, in a district now known as Kerak. They were descended from Moab, a son of Lot, and were closely connected with the Hebrews, the two peoples having had very similar languages and closely interwoven histories. After opposing the Israelites, they were subjugated by Saul and David, came under the rule of Assyria and were later conquered by Nebuchadnezzar. When their country was finally overrun by desert Arabs, culture and civilization came to a standstill, and even now their land is not entirely safe for travelers, because of the lawlessness of the inhabitants.

MOABITE STONE, an ancient black stone, about three feet eight inches high and two feet three inches wide, bearing an inscription in Hebrew-Phoenician characters. It is the oldest known of this form of writing, and was discovered in 1868 by F. A. Klein, a missionary at Diban, in Moab. An effort to purchase it by the French consul, Clermont-Ganneau, at Constantinople, led to difficulty among the Arab tribes of the district, and the stone was unfortunately broken, but the fragments were collected and a translation made of the thirty-four-line inscription, which dates from about 900 B. C. It records the deeds of Mesha, the Moabite king, and of his wars with Omri, king of Israel, and of his son Ahab. The remainder of the inscription refers to Mesha's building operations. The Moabite stone has great value as one of the oldest inscriptions in the North Semitic alphabet. It has been restored as far as possible and is now in the Louvre in Paris.

THE MOABITE STONE

MOBERLY, *mo' ber li,* Mo., a shipping point of local importance, is situated a little northeast of the geographical center of the state, in Randolph County, seventy miles southwest of Hannibal, 129 miles northeast of Kansas City and 148 miles northwest of Saint Louis. Railway service is provided by the Missouri, Kansas & Texas and the Wabash railroads. The first settlement was made in 1866; it was incorporated as a town and became the county seat in 1868. In 1873 it secured a special charter, which was surrendered in 1889 for city status. In 1910 the population was 10,923; in 1916 it was 12,752 (Federal estimate). The area is four square miles.

The district in which Moberly is located is rich in deposits of coal and fire clay, and bricks are the chief manufactured products. There is an extensive trade in live stock, dairy and farm produce, lumber, hides, wool and tobacco. Here are located the division headquarters and ex-

tensive machine shops of the Wabash Railway, which employ 2,500 people. The city also has a shoe factory, a large grain elevator and cement works. Moberly has a $70,000 Federal building, a Y. M. C. A. building, Saint Mary's Academy, a business school and a Carnegie Library. Forrest Park, covering 200 acres, is the city's largest recreation ground. L.W.K.

MOBILE, *mo beel',* ALA., the second largest city and the only seaport of the state, is the county seat of Mobile County. It is in the southwest corner of the state, on the left bank of the Mobile River, where that stream empties into Mobile Bay. The city is thirty miles (the length of the bay) north of the Gulf of Mexico and 140 miles northeast of New Orleans. The population, which was 51,521 in 1910, had increased by 1916 to 58,221 (Federal estimate).

Mobile has an extensive domestic and foreign water commerce. Eighteen hundred miles of navigable waterways enter Mobile Bay. Large freight steamers ascend the Alabama River to Montgomery, 410 miles northeast, and up the Mobile and Tombigbee rivers to Demopolis, at the entrance of Warrior River. There are regular steamer routes from Mobile to New Orleans, New York, Cuba, the West Indies, Central America and South America. Water transportation is supplemented by the Louisville & Nashville, the Mobile & Ohio, the New Orleans, Mobile & Chicago, the Southern and the Alabama, Tennessee & Northern railroads. Two short electric lines extend westward.

The city has an area of nearly fifteen square miles. It is fifteen feet above the river, and is on a level, sandy plain which rises gradually westward to low, wooded hills. Here are favorite resorts during the heated season. Except for the business section the city is not compactly built; the pleasant homes, many of the houses in colonial style, surrounded by gardens, and the broad, regular streets lined with live oaks and magnolias, give the place much charm. Interesting and scenic features are the Bay and the "shell road" along the shore extending to New Orleans.

Buildings. The chief buildings are a $250,000 Federal building, erected in 1916, the cotton exchange and chamber of commerce, courthouse and the city hall. The Cathedral of the Immaculate Conception and Christ Episcopal Church are two of the most prominent churches.

Institutions. In Mobile is the medical school of the University of Alabama, the Convent and Academy of the Visitation, McGill Institute, Evangelical Lutheran Institute and Barton Academy, the latter a part of the public school system. Spring Hill College (Jesuit) is located five miles from the city. There are three public libraries. The city is the see of a Roman Catholic bishop. There are also a United States marine hospital, a city hospital and several infirmaries.

Industries. The Federal government has at various times financed the dredging of channels in Mobile Bay, and at a cost of more than $11,000,000 has completed the building of locks on the Warrior and Tombigbee rivers, to improve and extend the river trade. During the time from 1911 to 1914 the city made great improvements along the Bay and built docks which afford 1,500 feet of water front. The value of exports in 1915 was nearly $29,500,000. These consisted principally of cotton, cottonseed oil, lumber, timber and naval stores. The imports for the same year totaled about $3,870,000, and consisted of tropical fruits, especially bananas, coffee, mahogany, asphalt, sisal grass and manganese and sulphur ores. Mobile holds an important position among the cotton markets of the United States; quantities of cotton, garden produce, especially beans and cabbage, and corn, cotton cloth, meat products, live stock, and fish and oysters are shipped to domestic markets.

Industrial enterprises of the city include cotton compresses and cotton mills, saw mills and woodworking plants, an agricultural chemical plant, a large steel plant, machine shops and a shipbuilding yard.

History. Mobile has belonged successively to France, England, Spain and the United States. In 1699 Sieur d'Iberville, the founder of Louisiana, moved a settlement from Biloxi to Twenty-Seven Mile Bluff, a point on the river about twenty miles above the present site of Mobile. After the floods of 1709 it was moved to the third and permanent location. Until 1720 the settlement was the capital of the French province of Louisiana. In 1803 it became a part of the United States as a result of the Louisiana Purchase. In 1819 it was granted a city charter. The commission form of government was adopted in 1910. Epidemics of yellow fever have been overcome by splendid sewerage and water systems. The latter is owned by the city and the supply is exceptionally pure. R.G.C.

Consult Powell's *Historic Towns of the Southern States;* Hamilton's *Founding of Mobile.*

MOBILE BAY, BATTLE OF, a naval engagement of the War of Secession, in which Farragut, the commander of the Federal fleet, caused

himself to be lashed to the mast of his ship during the conflict that he might the better watch the battle and give more effective commands. This engagement was fought on August 5, 1864, between the United States squadron under Farragut, and a Confederate fleet which had been inflicting great damage on Federal commerce. The entrance to Mobile Bay was protected by forts Morgan and Gaines, and the Gulf Channel, except a narrow passage under Fort Morgan's guns, was closed by piles and torpedoes. Fighting began at seven o'clock on the morning of August 5; Farragut, guiding his fleet through the lines of Confederate batteries and burning rafts, finally reached the harbor, where the ironclad *Tennessee* and three gunboats were lying in readiness for an attack. He ordered the course of his vessels directly across the torpedoes, sank one Confederate gunboat and drove another aground. The *Tennessee* attacked the entire Federal fleet, but was soon completely disabled and hauled down its flag in surrender. Forts Gaines and Morgan capitulated on August 7 and 23, respectively. Farragut accomplished this feat with the loss of only one vessel, the *Tecumseh,* and while he did not capture Mobile, he cut off all of its communication with the sea.

MOBILE RIVER, a river of Alabama, important for its situation in the center of the great cotton region. The river was named from the Mobile, or Maubila, Indians, now an extinct tribe. It is formed by the Alabama and Tombigbee rivers, which unite in Clarke County, and after a six-mile course it divides into two branches, the Mobile and the Tensas. The river is navigable for large steamers, and is an important means for inland transportation for cotton and agricultural products to the sea. The city of Mobile has an advantageous position for trade, for it is the outlet of one of the greatest cotton regions in the United States.

MOCCASIN, *mok'a sin,* **FLOWER,** or **PINK LADY'S SLIPPER,** a fragrant wild flower of the orchid family, one of the loveliest blossoms of American woodlands in the flowering months of May and June. It belongs to a subdivision of the orchids known as lady's slipper (which see). Its large, showy blossom bears an inflated sac or lip, which gives it a curious resemblance to a slipper, or moccasin, and its popular names have been thereby derived. The moccasin flower is distributed from Canada southward to North Carolina and westward to Kentucky and Minnesota; the latter state has chosen it to be its state flower. Once it grew in profusion, but the exquisite pink blossoms proved so tempting to the wayfarer it is now one of the rarest of the wild flowers. The inflated lip of this plant is a wonderful device of nature to help in the work of cross-fertilization (which see). Through a fissure down the front the bumblebee pushes its way inside to feast on the rich stores of nectar, and in its escape it leaves behind a supply of pollen and carries away on its back another load, which will be deposited within the flower next visited. See Botany, subhead *Why Plants Need Insects.*

MOCCASIN FLOWER

MOCCASIN SNAKE, a vicious, poisonous serpent of the pit viper family, related to the copperhead (which see). By some authorities its poison is considered more dangerous than that of the rattlesnake. It is sometimes called the *cotton mouth,* as its mouth, when wide open, shows white in contrast to the general color of the body, which is dark brown. On its sides are dim, blackish bars, and its black abdomen is marked with spots of yellowish-white. Its body is four feet in length, and its tail, which is entirely without rattles, is about seven inches long. This reptile is found in large numbers in the swamps and marshy regions from southern Indiana and southeastern Virginia to the Rio Grande. It subsists chiefly on fishes and frogs, which it pursues with the greatest speed in the water. Eight or ten young are produced annually. The moccasin in captivity becomes tame, good-natured and sluggish; it is fed small rabbits, rats, birds, fishes and frogs.

MOCK'ING BIRD, an American songster famous the world over for the melodious quality of its singing notes and its marvelous ability to imitate the sounds of other birds. One bird naturalist, L. M. Loomis, records that he heard a mocking bird of South Carolina imitate the notes of thirty-two different species of birds during a period of ten minutes. Some mocking birds, however, are quite lacking in this power of imitation. The lovely music furnished by this national song bird of the United States is beautifully described by Longfellow in the following lines from *Evangeline:*

Then from the neighboring thicket the mocking bird, wildest of singers,
Swinging aloft on a willow spray that hung o'er the water,
Shook from his little throat such floods of delirious music,
That the whole air and the woods and the waves seemed silent to listen.

Nature, though lavish in her gifts when she created the throat of the mocking bird, denied it a garment of brilliant hue. The ashy-gray coat, darker wings and tail, white outer tail-feathers and grimy-white breast constitute a modest garb indeed. The bird is from nine to eleven inches in length, and is delicately and beautifully proportioned. Male and female are almost alike in coloring, the female having a little less of white in her plumage. These birds range from eastern Nebraska, southern Iowa, Illinois, Indiana, Ohio and Maryland south to eastern Texas, southern Florida and the Bahamas, but are found in greatest numbers in the Southern states.

THE MOCKING BIRD

The nest is built in thickets, low trees or bushes, and contains four to six pale greenish-blue or bluish-white eggs. In the winter the mocking bird feeds on the berries of the holly, smilax and myrtle, but its food during the nesting season is chiefly insects and worms. If taken captive when young this bird becomes easily accustomed to cage life. E.T.S.

MODE. *Mode* means *manner,* and the mode of a verb is that particular form from which we learn its manner of asserting—that is, whether it is stating an actual fact, giving a command, or expressing a doubt, wish, possibility or mere supposition. The word *mood* is often used.

Three English Modes. *Indicative.* When we say, "She sings," "She cannot sing," or "Is she singing?" the verb either states a fact or asks a question as to a fact. It is said to be in the *indicative mode.*

Subjunctive. When we say, "You would admire her voice if she were singing her best," the verb *were singing* expresses what is only a supposition, for it is clear from the sentence that she is not singing her best. When Shelley, addressing the skylark, wrote:

Better than all treasures
That in books are found,
Thy skill to poet were, thou scorner of the ground,

he was also expressing a supposition, *were* being equivalent to *would be.* When Lady Macbeth said, "Now good digestion wait on appetite," she was expressing a wish. In such constructions as these the verb is said to be in the *subjunctive mode.*

In this mode the present indicative forms of the verb *to be—I am, you are, he is*—become *(if) I be, (if) you be, (if) he be*—plural the same; the past indicative forms—*I was, you were, he was*—become *(if) I were, (if) you were, (if) he were.* In other verbs it is only in the third person singular of the present tense that the root-form of the verb in the subjunctive differs from the indicative, *he calls* becoming *(if) he call.*

Imperative. When we say, "Sing louder," or "Lead us not into temptation," the verb expresses a command or an entreaty, and is said to be in the *imperative mode.* Its subject is always *thou, you* or *ye,* generally understood, and its tense always present. These three are the only true modes in English grammar.

So-Called Potential Mode. Some grammarians recognize a potential mode, in which they include those forms of the verb that employ different auxiliaries to express ability, possibility, necessity and the like. These uses are illustrated in the following sentences: She *can* or *could* sing (ability); she *may* or *might* sing (possibility or liberty); she *must* sing to keep in training (necessity); she *should* sing every day (obligation); she *would* sing if she were asked (willingness); she *would* sing in spite of her cold (determination).

Present Status of the Subjunctive Mode. We hear a great deal nowadays to the effect that the subjunctive mode is becoming obsolete and will soon be dropped from the language. Yet, in spite of the fact that it is not now used nearly so much as formerly, its forms must be learned by every one who makes any pretension to speak correctly. There are certain cases, as has been explained, in which there is no question as to the necessity of using the subjunctive. There are others in which the subjunctive, though not insisted upon, helps the writer to express fine shades of meaning that it would be impossible to bring out in any other way.

MODENA, *maw da' nah,* a city in Northern Italy lying in a fertile plain between the Secchia and Panaro rivers, about twenty miles south of the Po River; it is the capital of the province of the same name. Modena is the ancient Mutina that the Romans captured from the Boii in 215 B.C. It was almost wholly

destroyed by the Huns in the fourth century, and the ravaging Lombards later completed its devastation. In the eleventh century it was refounded by Mathilda of Tuscany, who began the construction of its splendid cathedral. The later Dukes of Tuscany built several fine palaces which are now used as schools, museums and government buildings. Modena has a small trade in linen, silk goods and iron, but derives its main importance from its schools, art gallery, palaces and churches. Population of city and suburbs, 1914, 75,000.

MODERN TENDENCIES IN EDUCATION. See subtitle, in article EDUCATION, page 1938.

MODJESKA, *mah jes'ka,* HELENA (1844-1909), a noted Polish actress who won distinction in Shakespearean and other rôles. She was born in Cracow, and at the age of seventeen married Modrzejewski, from the contraction of whose name she was known professionally. She made her first appearance in 1861, in an amateur performance in her own country. Her husband died in 1865; three years later she married Count Bozenta Chlopkowski and one year thereafter became the star of the Imperial Theater of Warsaw. In 1876, owing to political difficulties, she left her native country for the United States, and in the following year made her first American professional appearance, in San Francisco. Her success was immediate. Though she never used the English language with ease, her great natural gifts gained for her a foremost rank in tragic rôles. She starred with Edwin Booth in 1883, and remained well beloved and honored until her death. Her favorite impersonations were Juliet, Rosalind, Camille and Mary Stuart.

HELENA MODJESKA

MODOC, *mo'dok,* a small group of Indians, closely related to the Klamath tribe, and living originally on the rich lands about Lake Klamath and the Lost River Valley, in northern California and southern Oregon. Their name means *aliens,* and it was applied to them by a neighboring tribe. Their bitter struggles against the white settlers and their raids upon neighboring tribes for slaves earned them the reputation of being a hostile, warlike people. The women were expert basket weavers. Their homes were mud-covered huts built of timbers, sometimes well hewn. After a number of treacherous dealings on both sides these Indians were subdued by United States troops and confined on the Klamath Reservation in Oregon and the Indian Reservation in Oklahoma. They number less than 300. See INDIANS, AMERICAN.

MO'GUL, the Arabic and Persian form of the word *Mongol* (see MONGOLS).

MO'HAIR, the name given to the hair of the Angora goat, a native of Asia Minor, and to a lustrous, durable material made from it, sometimes called *alpaca.* Except in rare cases, the natural color of the hair is white, and it lacks the felting properties of wool. No fabric excels mohair in durability, and because of this fact it is largely employed in the manufacture of material which is subject to hard usage, as in furniture and railway plushes. The luster is so enduring that no amount of dyeing or washing will dim it. Many mixtures are made of mohair and silk, and numerous imitations are made of wool and cotton for women's apparel. Mohair was originally manufactured in the East and only small quantities were exported, but now it is produced in all parts of Europe and America.

MOHAMMED, *mo ham'ed* (about 570-632), an Arabian, founder of the religion known in the West as *Mohammedanism,* in the East as *Islam.* He was born of poor parents, whose home was in Mecca, and whose members were of the powerful tribe of Koreish. His father died while Mohammed was a baby, and his mother, following a custom of the time, gave the child to a Bedouin nurse, to be raised in the desert. He was subject to attacks of epilepsy, and after three years was returned to his family as one possessed of demons. His grandfather adopted him, but soon died, and the child was again adopted, this time by his uncle, Abu Talib, a thoroughly good man who was destined to be one of Mohammed's most helpful friends. With him the boy went on fine, long journeys with the caravans through Arabia and Syria. When he was twenty-five he began service for a wealthy widow, Khadija, whom he soon married, although she was about fifteen years older. He successfully took care of her business, managing her merchant caravans, and becoming known as an honest, upright man of good judgment.

Mohammed, like most great leaders and teachers, was a product of the conditions of his time. Ever since the days of the Babylonian captivity there had been Jews scattered throughout Arabia who worshiped one God, Jehovah. The teachings of Christianity were being slowly spread in the East. Owing to the influence of Judaism and Christianity there was a strong religious unrest in Arabia, and many were turning from idolatry to find a purer belief. It had been Mohammed's custom from boyhood to spend a great deal of time alone, thinking upon religious subjects, and when he became older he spent an entire month each year alone on the mountain Hira, near Mecca. When he reached his fortieth year he declared himself to be a prophet and his writings of the *Koran* to be inspired revelations of divine will, entrusted to him through the angel Gabriel.

That he was strongly influenced by Judaism is shown by many of his teachings, such as the unity of God and the power of prayer and fasts; the influence of Christianity was probably less strong, though he taught the prophetic mission of Christ, admitting it to be second only to his own in importance. He retained some of the forms and teachings of the old idolatry. In Mecca was an ancient temple, the *Kaaba,* dedicated to the worship of the god Hobal, and Mohammed taught the sanctity of this place and the ceremonies of the pilgrimage to it. His preaching against idols brought unpopularity, and temporarily he had to leave Mecca in flight to save his life, but he soon returned.

At this time, about 621, his wife, one of the most faithful converts to his faith, and his uncle, both died. Again he left Mecca, this time going to Taif in a vain effort to better his broken fortunes. He was compelled to return to his own city, where he soon gained the converts which gradually brought the turning point in his career. These men were from Yathrib, an important city north of Mecca, which had been a home of Judaism for many years. Here the new faith was kindly received and it spread rapidly. In course of time his popularity in Yathrib was assured, and he, with about 150 of his followers, went in 622 to that city, which became known as Medina, *the city of the Prophet.* This flight, or *Hegira,* is the event which marks the beginning of time as reckoned by Mohammedans. It was a very important circumstance in the life of the new religion.

Up to this time Mohammed had held an humble place indeed in his world, but after entering Yathrib his position became one of power and influence. Soon after he became established there he claimed to have received divine permission to spread his faith by means of warfare, and he gradually won all of Arabia. His missionaries were sent to Khosen II, of Persia, to the Emperor Heraclius of Byzantine, to the king of Abyssinia and to the governor of Egypt. They were not received in Persia, which event led to the first war between the Moslems and the Christians. At the time of his death plans were being made for the conquest of Syria and war with the Roman Empire. He named no one who should succeed him as leader of Islam, but suggested two, between whom the loyalty of Mohammedans was divided.

Mohammed was an Oriental, no better, no worse than the most of his followers. He was not an idealist, and his creed made few severe demands on belief or conduct. His leadership was kindly to his friends, ruthless to his foes. He understood human nature and especially that in the part of the world in which he lived. To-day his followers, 250,000,000, are greater in number than the followers of any other religion. The religion he founded is described under its title, MOHAMMEDANISM. E.B.H.

Consult Sell's *The Life of Mohammed* and references given in the article MOHAMMEDANISM.

MOHAMMEDAN ARCHITECTURE. Practically every new style of building is the result of some previously developed style or styles modified to express the needs and ideals of a certain people. Especially is this true of Mohammedan architecture. As a result of conquests beginning in the seventh century, the Saracens came to know and use the architectural forms of parts of the Byzantine Empire, Syria, Persia, Egypt, Asia Minor, Northern Africa and Spain. Influenced by their creed, which forbade representation of any living object, their Oriental love of ornamentation and color expressed itself in the most elaborate surface designs of geometric patterns. In some instances, as the alabaster screens in the Taj Mahal (which see), these patterns were openwork designs.

The minaret (which see) was also a direct result of the Mohammedan religion. This is a tall slender tower of many stories, each surrounded by a balcony, from which the muezzin calls the people to prayer. The Saracens developed the bulbous dome, often brightly col-

ored, and the horseshoe and stalactite arches. The domes were first built only over tombs, but later, over the prayer halls also, as in the Aksa Mosque and the Dome of the Rock at Jerusalem. In the mosques (which see) the many pillars were usually small in diameter. Mohammedan architectural forms included mosques (by far the most frequent and familiar), mausoleums (tombs), minarets, klans (inns), hospitals, bazaars (markets), and a few palaces.

Mohammedan and Indian architecture combined to produce one of the most exquisite buildings in the world, the Taj Mahal. The Alhambra (which see), so beautifully described by Washington Irving, is an expression of Mohammedan and Spanish architecture, and the old Christian Church of Saint Sophia has the Mohammedan characteristic of many minarets.

MOHAMMEDANISM, *mo ham' e dan iz'm,* the name of a religion founded by Mohammed, about 600 A. D., and having at the present time about 250,000,000 followers, a greater number than is claimed for any other religion. It was

MOHAMMEDAN COUNTRIES

In addition to the areas shown above, there are about 20,000 Mohammedans in the United States and Canada and 10,000 in Dutch Guiana.

called by Mohammed *Islam,* meaning *resignation.* Islam as taught by Mohammed was a combination of the teachings of idolatry, Judaism and Christianity, and the conclusions of a wise and experienced student of human nature. Understanding the Oriental mind, he made few demands unlikely to be easily met; the white heat of religious zeal was satisfied by the exalted conception of the God of the Jews, and fasts and sacrifices which were enjoined were followed by revels.

The teachings of Islam contained in the *Koran,* the bible of Islam, may be divided into the two groups, *faith* and *religion,* or works. The fundamental doctrines of faith were found in the Pentateuch, Psalms and the Gospels, parts of the already existing Hebrew Bible. These were adapted by Mohammed and were the basis of the *Koran.* The *Koran* teaches faith in God and in angels, belief in resurrection and final judgment, and in the doctrine of predestination. To these Hebrew and Christian beliefs the *Koran* adds the idolatrous faith in good and evil spirits or genii, fairies, giants and fates. As the *Koran* was claimed to be the latest and truest expression of divine will, so Mohammed's importance exceeded that of all the former prophets, among whom were included Christ, disclaimed by Mohammed as the Son of God.

After the death of Mohammed students and devotees of his faith explained and added to many of his teachings, meeting in his spirit so far as possible the demands made by new conditions. In this way there came into existence a vast amount of teaching, including Mohammedan law, which did not come from the prophet. The doctrine of fatalism was also emphasized and enlarged by later writers.

The *Koran* teaches four cadinal works, prayer, almsgiving, fasting and a pilgrimage to Mecca. Prayers are to be said at five appointed times every twenty-four hours. They consist of lines from the *Koran,* praise and thanksgiving, and to some extent, petition. Certain prescribed washing (with sand in the case of the Bedouin far from water) must be performed before each prayer. The place on which the suppliant kneels must be clean, and the use of the prayer rug is a result of this teaching. Almsgiving once consisted of a legal tax and a voluntary offering; there was so much objection to the first that it was in time abandoned.

Fasting is required during the month of Ramadan, the ninth month of the Mohammedan calendar, which is calculated upon phases of the moon. To this is due the fact that Ramadan does not occur at precisely the same season from year to year. When the fast comes at the hot time of year, the hardship is very great. People for whom it might be too severe, as sick persons, are excused. Only during the daytime is the fast required, and at night the privilege of breaking the fast often results in revelry and excesses. At the end of the month a feast of several days duration is observed.

The fourth duty required of the Mohammedan is a pilgrimage to Mecca. Mecca is the sacred city, being the birthplace of Mohammed; in it is the old shrine, the *Kaaba,* sacred

to idolaters before the time of Mohammed, one of the ancient objects of worship and a place of importance in Islam. The pilgrimage to Mecca may be made at any time of year. The twelfth month, however, is known as the special month of pilgrimage. Then there are observed certain rites and ceremonies not observed at any other time.

The Koran teaches the sanctity of marriage according to Oriental standards. Polygamy is allowed, though not now generally practiced.

MOHAMMEDANS AT PRAYER

Whether alone in the desert or on a crowded street, the devout Mohammedan observes a strict compliance with devotional commands. Thirteen attitudes are required before his prayer is fully offered. He must face towards Mecca, must remove his shoes and must prostrate himself on his prayer rug.

Murder, forbidden in general, is punished according to circumstances. The vendetta, or blood feud, is common and sanctioned among Mohammedans. The one who kills an infidel, a follower of a different faith, is splendidly rewarded in the life beyond the grave. Infidelity to Islam is to be punished by death. All those slain in what are called Holy Wars are martyrs and obtain martyrs' rewards.

The Koran forbids drinking of intoxicating liquors, gambling, taking of usury and the making of an image of any living object, man or beast.

It has long been the fear of nations that Mohammedans might bring about a Holy War against the followers of all other faiths, a fear which has probably not been realized because of dissensions among Mohammedans. After the death of the prophet his followers were divided by those contending for the place of highest authority. This has been a source of great weakness in Islam. The improbability of unified action and the better understanding and sympathy among men that has come with the passing years have very much lessened the danger of a Holy War. E.B.H.

Consult Margoliouth's *Mohammed and the Rise of Islam;* Zwemer's *Arabia.*

Related Subjects. The following articles in these volumes will be of interest in connection with a study of Mohammedanism:

Bible
Christianity
Fatalism
Hegira
Islam
Kaaba
Koran
Mecca
Medina
Mohammed
Predestination

MOHAMMED V (1844-), twenty-ninth sultan of the Turkish Empire since the conquest of Constantinople (1453), and the thirty-sixth in male descent of the House of Othman. Mohammed V is the third son of Abd-ul-Medjid.

On April 27, 1909, he was chosen by the National Assembly to succeed his brother, Abdul-Hamid II, who had been deposed by the "Young Turk" army led by Midhat Pasha, because he failed to introduce reforms as required to do by the Treaty of San Stefano. The Cabinet of the government was reconstructed after the assassination of Grand Vizier Mahmud Shevket Pasha, and the present Turkish government came into power on January 24, 1913. Mohammed V cast his lot with the Germanic powers in the War of the Nations, entering the conflict in 1915 against France, England and Russia.

MOHAVE, *mo hah' vay,* a tribe of Indians of notably fine physique and appearance, living along the lower Colorado River in Arizona and California. They cultivate patches of corn, pumpkins, melons and beans and also gather the natural mesquite beans for food. From the river they take a few fish. Their houses are low-walled huts with flat tops, built of brush-like mats between four corner posts. They make and break camp easily and between crops move about at will. They make splendid pottery. This and their own bodies they decorate with artistic designs in natural colors. The dead are cremated. The Mohave live on the Colorado River reservation in Arizona. See INDIANS, AMERICAN.

MO'HAWK, the oldest, and, during colonial times, the most powerful tribe of the Iroquois confederacy, or Five Nations (see FIVE NATIONS). Their territory, when white men first knew them, was along the valley of the Mohawk River, in eastern New York; from there it extended northward to the Saint Lawrence and southward to the east branch of the Susquehanna. Just east of the Mohawk across the Hudson were the Mohican (which see). They were the first tribes to come in contact with the Dutch and English settlers; with these they traded and received firearms in return for pelts. Their central position exposed them to all the waves of warfare during the stormy colonial period, and by 1677 their villages were reduced to five. They joined the British in the American Revolution, and at its close most of them went to Canada, where they were established by the government on reservations. See INDIANS, AMERICAN.

MOHAWK, a river of the United States which was regarded as the gateway to the West in the War of Independence. It rises in Lewis County in northern New York, runs nearly southeast to Utica, and after many curves enters the Hudson at Cohoes, about nine miles above Albany. It is the largest tributary of the Hudson, with a total length of about 150 miles, and its valley is remarkable for fertility and beauty. The Erie Canal runs close to it as far as Rome, as do the New York Central and West Shore railroads. It is an important source of water power for numerous manufacturing industries, having in the upper part of its course rapids and falls which afford excellent motive power. The chief cities along its course are Rome, Utica, Ilion, Little Falls, Herkimer, Fort Plain, Canajoharie, Fonda, Amsterdam, Schenectady, Albany, Mechanicsville and Cohoes.

The Mohawk Valley was the home of the Mohawk and other Indian tribes, as well as the headquarters of the Five Nations (which see), and the atrocious massacres of Cherry Valley and Schoharie occurred there. At the outbreak of the Revolutionary War an effort was made by both English and Americans to secure possession of it, and the valley was the scene of many battles.

MOHICAN, *mo he' kan,* or **MAHICAN,** one of the most powerful tribes of the Algonquian family, who dwelt along the Hudson River in New York. They were bitter enemies of the Mohawk (which see), with whom they were in almost constant warfare, and whose attacks led them to move their council fire to the site of the present Stockbridge, Mass. Gradually losing their tribal identity, a remnant, known as the Stockbridge Indians, are now settled upon a reservation near Green Bay, Wis. The Mohicans were renowned fighters, resorting to craftiness and deceit, fighting from ambush and in the dark rather than in the open. Cooper has told their thrilling story in *The Last of the Mohicans.* They were a well-built people, strong and wiry. Their curious houses, sometimes 180 feet long and nearly twenty feet wide, were made by planting two parallel rows of saplings, whose tops were bent over to form the roof, the outside being covered with split poles and bark.

A closely-related tribe, the *Mohegan,* whose name is a dialectic form of Mohican, lived in Connecticut along the Thames River. By treaty with the English they were allowed to remain in their old home, but intermarriage with negroes and whites became so common among them that not a full-blooded Mohegan remains.

MOKI, *mo ke,* a name sometimes applied to the Hopi Indians (which see).

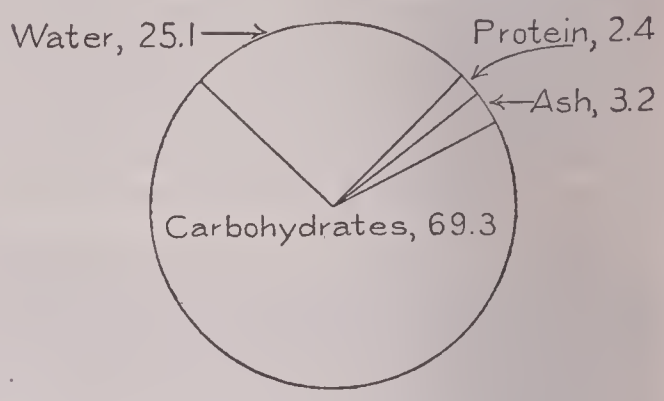
MOLASSES, *mo las' ez,* from the French *molasse,* meaning *flabby,* is a dark brown, sometimes yellowish, uncrystallizable substance, having the appearance of a thick, sticky syrup. It is one of the by-products of sugar cane manufacture, and is extensively used in cooking and in making confectionery. *Molasses* and *treacle* are sometimes used as synonymous terms, but the latter properly refers to the syrup obtained in sugar refining.

How It Is Made. Molasses is the liquid which in the process of manufacturing sugar is separated from the mass containing the sugar crystals, this crystallization being brought about by two methods, the "open kettle" and the vacuum pan. The former consists of boiling the juice of the cane in circular or rectangular open pans having steam coils. After several boilings the juice is reduced to the form of syrup, and this in turn to a stiff mass of syrup and crystals, called the *massecuite.* The massecuite is drawn off into hogsheads and the molasses seeps out through perforations in the bottom. Molasses made in this way is of excellent flavor, but as this process has been largely replaced by the vacuum-pan methods, the product described above is not found on the market in large quantities.

By the other method, the one which is generally used in the large modern sugar factories, the massecuite is obtained through a series of boilings in vacuum pans. It is then conveyed to a mixer, where it is thoroughly stirred, the crystals and syrup being kept from separating by a set of revolving paddles. The massecuite is then conveyed to cylindrical vessels (known as centrifugals), having walls of copper gauze sufficiently fine in texture to prevent the crystals from passing out through the meshes. Each vessel contains a shaft which makes about 1,000 revolutions a minute, and in the course of this rapid motion the molasses is separated from the sugar crystals and thrown out through the perforations in the gauze.

The molasses thus obtained contains about 50 per cent of sugar, and is usually reboiled until all of the crystallizable sugar has been removed. In Louisiana, however, some of the product fresh from the centrifugal is diluted with water and sold to local customers as table molasses, and to the manufacturers of glucose syrup. The first reboiling produces "second sugar" and "second molasses," the second reboiling "third sugar" and "third molasses," and so on. The refuse molasses obtained through several boilings is utilized to some extent in feeding stock, in fertilizing and in the distillation of rum. "Third molasses" is mixed with glucose to make a table syrup, and the so-called New Orleans molasses is largely glucose flavored with molasses.

The United States Department of Agriculture has ruled that standard molasses shall not contain more than 25 per cent of water nor more than 5 per cent of ash. See Food, subhead *Chemistry of Foods.*

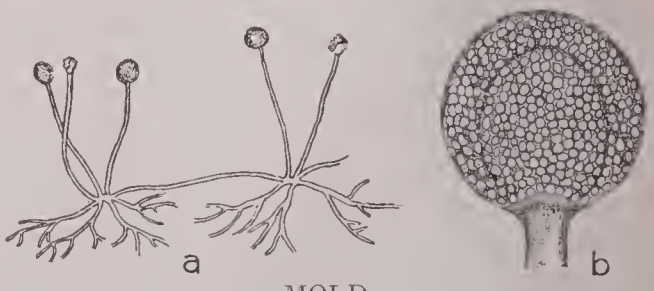


FOOD VALUE OF MOLASSES

The fuel value is 1,290 calories per pound (see Calorie).

Production. The production of molasses is confined to the sugar cane countries of the world, chief of which are Cuba, Java, Hawaii, the United States, Porto Rico, Brazil, Peru, Mauritius, Queensland, Argentina and the Philippine Islands. The greater part of the molasses made in the United States comes from Louisiana, which has a yearly output of about 23,000,000 gallons. B.M.W.

MOLD, the furry covering that appears on food left in a damp place, or on decaying matter, is a minute vegetable growth. Mold starts from a dustlike particle called a spore, which swells, bursts and sends out threads, some of which are like roots, others like branches. Each branchlike thread develops a *sporangium* or spore case, no larger than a pinhead, in which thousands of spores appear. When the cases break open these spores float away with the dust of the air, ready to reproduce themselves in any damp place. Mold will not grow in cold air, and will wither in sunlight. The bread



MOLD

(*a*) Black mold; (*b*) greatly magnified spore case, or *sporangium.*

mold and green cheese mold are its most familiar forms. The germs of mold, as of other fungous growths, may cause disease if taken into the body.

MOLE, a muscular little animal, a builder of underground homes, and the farmers' friend because of its destruction of grubs and worms.

THE MOLE

A cross section of his underground home is shown. Chambers may extend many feet in various directions.

Though it sometimes damages crops through the disturbance of delicate roots, it never eats vegetable matter. Little surface hills of earth which have been thrown up in the process of tunneling disclose the presence of moles underneath.

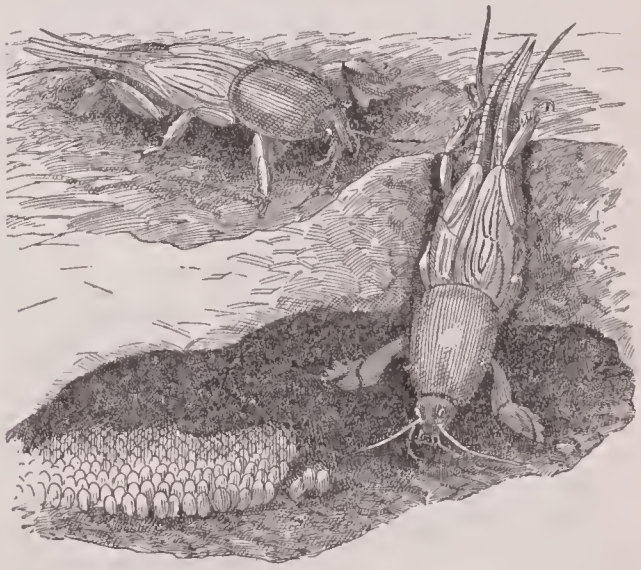
Common moles are found from Canada to Florida and throughout Central Europe. They are thickset, five or six inches long, with narrow, slender muzzles, small, fur-hidden eyes, no exterior ears, short, naked tails and short, powerful legs. The commercially valuable fur is thick and soft, and the hairs may lie either forward or backward. Bluish-gray moleskin is most in demand by furriers, but black, brownish-black and pale shades are not rejected by garment makers. Undressed pelts are valued at only a few pennies, but the expense of working them brings the price of a small moleskin cap to $15 or $25. Moleskin is light in weight, yet warm, but its wearing qualities are poor.

Going down to the homes of these greedy, insect-eating animals, wonderful structures are found. Loose earth is fashioned into such hard central chambers and tunnels in all directions that heavy rainstorms do not destroy them. In the winter the little animal avoids the frost by tunneling deep down into the earth, sometimes four feet below the surface. In early spring four or five baby moles are produced at a birth, and are housed in a warmly-lined central chamber. Sometimes a second brood appears in autumn. Young moles quickly reach their full size. These animals like water, and they swim well. They are always hungry, and if deprived of food for ten or twelve hours will die.

One American species of mole is called the *star-nosed mole* (see subhead below). Other burrowing, insect-eating animals are sometimes called moles, such as the shrews and the golden moles of South Africa. See SHREW.

Star-Nosed Mole. This little creature, which is not quite nine inches long, is so called because it has a starlike fringe of cartilage about the nose. It is dark brownish-gray, paler beneath, and has a long hairy tail which is sometimes thickened at the base. It ranges throughout Northern North America as far south as the Southern United States. The star-nosed mole is fond of life near and in the water, so one may look for its tunneled home in the soil of swamps and along the borders of brooks and ponds. The opening of its burrow is often beneath the water. In the winter it burrows deep down in swampy places, out of the reach of frosts, and sometimes swims beneath the ice of frozen brooks in search of water insects. It is a true night prowler, and in the daytime prefers its underground dwelling to the sunlight, for it does not even emerge at noon for a sun bath. M.S.

MOLE CRICKET, a large insect belonging to the family of crickets, but which combines some of the habits of the mole with its own special traits. The crickets are the most musical of



THE MOLE CRICKET

Showing underground home and egg chamber.

all the families of insects, and even the mole cricket "plays a tune" with its wings, although the sounds are not usually considered cheerful. The insect is about one and a half inches long, of a velvety-brown color, with short front legs,

not unlike those of a mole, and usually with short wings, which, however, may be entirely absent. These crickets spend their lives underground, and travel in burrows of their own digging. Their food is larvae and earthworms, and they destroy the roots of plants. The female lays from 200 to 400 eggs. In Porto Rico these insects are called *changa,* and there they cause great damage to vegetation and crops.

MOLECULE, *mol' e kule,* in theory, the smallest physical unit into which matter may be divided. A molecule of water, for example, is the smallest possible particle which retains its identity as water. The molecule, which cannot be further divided by crushing or grinding or by the application of any mechanical or physical force, can be broken up by chemical action into the parts which unite chemically to form it; these parts are known as *atoms* (see ATOM). Sometimes the atoms are all of one kind, in which case they unite to form an *element;* oxygen, for example, is an element, because its molecules are formed by the union of similar atoms. Many times, however, atoms of different kinds unite to form a molecule, and the result is a *compound;* water is a compound, since each molecule of water is made up not of water but of atoms of oxygen and hydrogen. These atoms are in the proportion of two atoms of hydrogen to one atom of oxygen; this combination is symbolized as H_2O. In the composition of matter, atoms unite chemically to form molecules, and molecules unite physically to form *mass.*

A molecule, of course, has never been seen, even under the most powerful microscope. This is not surprising when one stops to consider that the molecules that unite to make up a volume of gas as large as the head of a pin are thirty million times as numerous as the people who inhabit the globe. In no laboratory, then, has a molecule ever been physically separated from its fellows. Scientists, however, need a unit in conducting their work, and so they have imagined this tiny, ultimate bit of matter and called it a molecule.

Molecular Force. Molecules are held together by a mutual attractive force not unlike that of gravitation (which see). As with the sun and planets, this force acts most strongly when the molecules are nearest together. In a *solid* the molecules are so close together that they can move very little, and the definite form of the body is not readily changed. In *fluids* the molecular force is less; the molecules change their relative position easily, and the substance has no definite shape. In *gases* the force is so slight that the molecules tend to fly apart and expand as widely as possible. Water is a substance which appears in all three states; as a solid (ice), as a liquid and as vapor (steam). Heat affects the force with which the component molecules attract one another; the degree of heat present determines whether water shall have a fluid, a solid or a gaseous form.

Molecular Weights. Gases, like solid bodies, have weight. The relative weight of the molecules composing them is determined by weighing like volumes of two gases and assuming that they contain the same number of molecules. A given volume of hydrogen is lighter than a like volume of any other known substance; consequently it has been found convenient to adopt it as the unit of measurement and call its molecular weight 2, since each molecule is composed of two atoms whose weight is regarded as 1 each. Other gases are said to be so many times heavier than hydrogen. In the study of chemistry, many other ways of determining molecular weight are given. Some approximate molecular weights follow:

Hydrogen	2	Nitrogen	28
Oxygen	32	Salt	58.5
Water	18	Caustic soda or sodium hydroxide	40
Sulphur	64		
Ozone	48		

See CHEMISTRY; ATOMIC THEORY. G.L.

MOLIÈRE, *mo lyair'* (1622-1673), the name by which the greatest of French dramatists, JEAN BAPTISTE POQUELIN, is known in the literary world. Of the dramatists who have lived since the beginning of the modern period he ranks next to Shakespeare, and in his power to combine humor and pathos is often compared with the great English genius. Molière distinguished himself as a writer of social comedy. That is, he gave an accurate picture of the society of his day, satirizing in brilliant and vigorous dialogue the weaknesses and foibles of the men and women about him. The humorous effect of his plays is obtained through the portrayal of character rather than

MOLIÈRE
Among modern dramatists he ranks next to Shakespeare, but the average English reader knows little of him.

through ludicrous situations; Harpagon, the chief figure of his masterpiece, *The Miser* (L'Avare), is one of the most striking creations in the world's dramatic literature.

Molière was both a dramatist and an actor, and began his career as manager of a theater which he helped to build. After the failure of this venture he joined a band of strolling players who gave performances in the rural towns. His first comedy, *The Blunderer,* was produced seven years later, in 1653. He continued his work as a writer and actor until the last year of his life, and it can truthfully be said that he died in the harness, for his death was brought about through his impersonation of a character in his last play, *The Imaginary Invalid.* In this he had to indulge in a violent fit of coughing, which caused the bursting of a blood vessel. Among his best comedies are *The School for Women, Tartuffe, George Dandin, The Misanthrope* and *Doctor in Spite of Himself.*

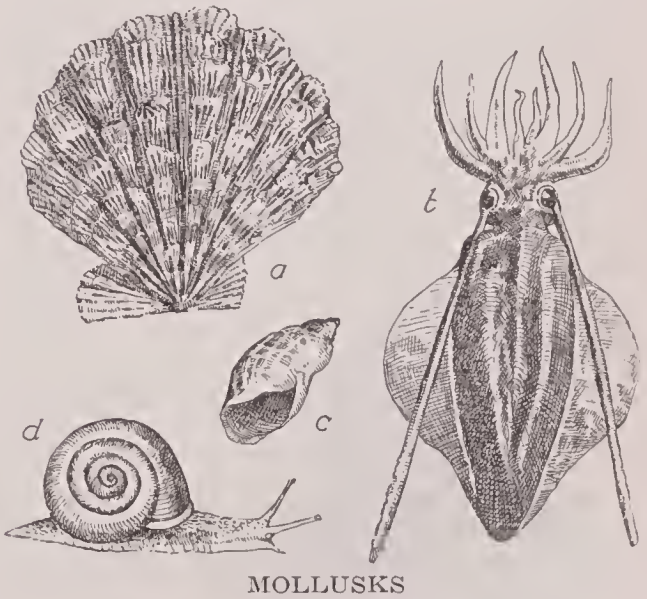
Consult Chatfield-Taylor's *Molière;* Matthews' *Molière, His Life and His Works.*

MOLINE, *mo leen',* ILL., a manufacturing city in Rock Island County, in the northwestern part of the state. It is situated on the Mississippi River, at the point where it receives the waters of the Rock River, and on the Hennepin Canal. Exceptional transportation facilities are offered by water and rail. The Chicago, Rock Island & Pacific, the Chicago Burlington & Quincy and the Chicago, Milwaukee & Saint Paul railways serve the city. Chicago is 179 miles east. Rock Island, the county seat, joins Moline on the west, and Davenport, Iowa, is across the river from Rock Island. These three cities, locally called the "tri-city," are closely connected by electric railways, ferries and bridges; they are regarded as one big community with a total population of nearly 100,000 (1916), that of Moline being 27,451 (estimated); of these 5,000 are Swedes and 3,000 are Belgians. Its population in 1910 was 24,199. The area of the city is five and one-half square miles.

In the channel between Moline and the island of Rock Island, in the Mississippi River, dams have been built to develop water power for the use of manufacturers. Extensive coal fields in the vicinity also contribute to the industrial development of the city. Moline is famous for the manufacture of agricultural implements, particularly steel plows and corn planters. About 3,500 people are employed by two plow companies, the annual output being valued at $32,000,000. Beside these the city has three automobile factories, at least one of them (Velie) with a large output, and it also manufactures elevators, scales, boilers, pumps, furniture, organs and foundry products. East of the city limits are located the large yards and machine shops of the Chicago, Rock Island & Pacific Railway. Moline is an important distributing point for lumber, grain and machinery. The most notable buildings are a $150,000 Federal building, erected in 1910; a city hall, constructed in 1913 at a cost of $170,000, and a $135,000 Y. M. C. A. building. In addition to its public school system, with a library and two high schools, it has a business college and a Carnegie Library. Outdoor recreation is provided by Sylvan, Deere-Stephens, Riverside and Prospect parks. Interesting features of the vicinity are Black Hawk Watch Tower, Campbell's Island and the United States arsenal on Rock Island.

The first settlement was made in 1829. In 1843 the town was platted by a mill company, who called it Moline, from the French word *moulin,* meaning *mill.* It was incorporated as a town in 1848, as a city in 1872, and it adopted the commission form of government in 1911. To the east is East Moline, a rapidly-growing manufacturing suburb. O.F.H.

MOLLUSKS, *mol'usks,* a numerous group in the animal kingdom known to naturalists as *mollusca,* a Latin word meaning *soft-bodied*



MOLLUSKS

(*a*) Scallop shell; (*b*) Tasmanian cuttlefish; (*c*) fresh-water snail shell; (*d*) North American snail.

animals. As the name indicates, all mollusks have soft, boneless bodies. Oysters and clams may be regarded as the most notable of this group. It includes also such curious mailed creatures as slugs and snails, as well as several interesting animals without shells, like the octopus, the nautilus, the cuttlefish and the squid.

The coat of mail that protects the oyster and numerous other shellfish from the dangers that surround them is secreted by the animal itself and is composed of carbonate of lime, which often has the marvelous iridescent shimmer of the rarest gems. The pearls found in the pearl-oyster are notable examples; the spiral conches cast up by the tide on beach or mud flat show us that many of the humble mollusks dwell in colored houses of more brilliant splendor than any palace decoration. The bodies shut within seem to have a rudimentary structure, but they exhibit, in reality, well-developed systems of nerves and circulation. One of the distinguishing marks of the mollusk is the fact that it uses a lung in breathing—a mere sac, to be sure, but still a lung. This is decidedly inconvenient for such mollusks as live in the sea, for they are obliged to come to the surface occasionally to breathe, while their neighbors, the fish, are equipped with gills that enable them to take the oxygen they need directly from the water.

Mollusks are, on the whole, rather sluggish creatures, which accounts for the habits of the oyster and the clam. The oyster, for example, which is active enough when young, soon attaches itself to a rock and spends the rest of its life in ease, waiting for the tides to bring it the food it needs. The clam is hardly more energetic. It is found in great numbers burrowing in the sand and mud along the seacoasts. Sometimes the clam digger spies its back thrusting up through the mud, when the tide is out. The soft-shell clam, which is easily the aristocrat of its family, digs itself in to a depth of a foot or more. It is conveniently provided with flexible tubelike projections, called *siphons,* which it thrusts up through mud and sand to the surface, sucking down both food and air.

Mollusks having two shells, like the oyster, are called *bivalved;* while snails, which have but one shell, are said to be *univalved.*

Related Subjects. A detailed knowledge of the most important species of these shellfish may be gained from a study of the following articles:

Argonaut
Chitons
Clam
Conch
Cuttlefish
Gastropod
Limpet
Mussel
Nautilus
Octopus
Oyster
Scallop
Sea Lemon
Sea Squirts
Slug
Snail
Squid

MOLOKAI, *mo lo kah' e,* one of the Hawaiian group of islands, noted principally for its colony of lepers. The island is about thirty-five miles long and eight miles wide, and has an area of 261 square miles. The climate is healthful and agreeable. Lepers from all parts of the islands are sent there by the government, where they are completely separated from the healthy inhabitants. The leper colony is governed chiefly by members of religious Orders of the Roman Catholic Church, who nobly give their services in administering to the spiritual and temporal needs of these unfortunate people. The most prominent among them was Father Damien, who after sixteen years of self-sacrifice died a victim of the disease. The children of the lepers are cared for in an asylum on the island of Oahu. Politically, Molokai is a part of the territory of Hawaii (see HAWAII). Population, 1910, 2,112.

MOLT'ING, the process by which Mother Nature has arranged that birds and beasts may shed their old skins, feathers, shells, hair, claws, beaks or horns, and develop them anew. This change is, of course, for the creatures' protection, since these parts of their bodies are gradually worn out through use, or become in some way unfitted for their needs. On some insects and reptiles, such as spiders and snakes, the outer covering, instead of increasing gradually in size, renews itself completely at certain intervals. An inner layer of cells secretes a fluid which hardens, protecting the newly-exposed body, at the same time shutting off nourishment from the old skin, which dries and hardens, finally dropping away. Birds shed their plumage once or twice a year, and often three times, each complete molt taking from four to six weeks. The feathers fall out one after another in regular sequence, and there is a corresponding renewal of their plumage; the birds, therefore, with few exceptions, are not prevented from flying at such times. The first molt of the season renews the bird's bedraggled winter plumage; the second decks it out for the mating season.

Some mammals, the highest order of animals, shed their hair once a year, usually in the spring; some of the deer family drop their antlers also at that time. Other creatures whose molt is somewhat extraordinary are the lemmings, animals similar to the guinea pig, and the ptarmigans, both of which drop their claws; while birds of the auk family shed the horny parts of their bill (see AUK). Caterpillars usually molt five times before becoming butterflies. See METAMORPHOSIS; also BIRD, paragraph "Molting," under subhead *Feathers.*

MOLT'KE, Helmuth Carl Bernhard, Count von (1800-1891), a Prussian soldier and military genius, ranking with Bismarck as a builder of the German Empire. He was born at Parchim, and in 1812 enrolled in the Royal Military Academy at Copenhagen. In 1822 he entered the Prussian army as second lieutenant, and in 1835 attained the rank of captain. After serving as adjutant to Prince Henry in Rome he returned to Germany, and in 1857 was appointed chief of the staff of the Prussian army. The full test of his efficiency was made in the Seven Weeks' War in 1855 between Austria and Prussia. The great triumph of his career, however, was the Franco-German War of 1870-1871, which he had foreseen and prepared for; his plans were carried out with remarkable precision. He was made a field-marshal on his return to Berlin from France; Parliament granted him $225,000 and appointed him a member of the upper house for life. The title of count was also conferred upon him.

VON MOLTKE

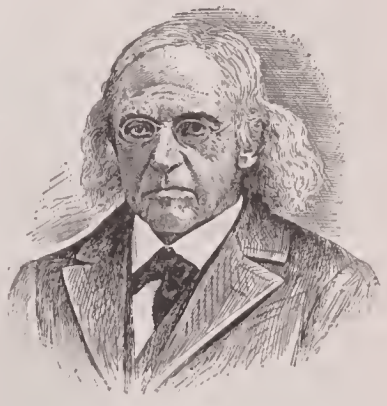
After the accession of Emperor William II in 1888 he resigned on account of advanced age, and when he was ninety all Germany celebrated his birthday. Moltke was a man of simplicity and of devotion to duty. His writings include essays on Turkish affairs, *The Franco-German War of 1870-1871* and *Moltke's Tactical Problems from 1858 to 1882.*

Helmuth Joannes Ludwig von Moltke (1848-), a nephew of the above, also chose the army for his career. He served in the Franco-German War and upon the outbreak of the War of the Nations in 1914 was expected to take an important part in the conflict. After the Battle of the Marne in August he was superseded temporarily by Von Falkenhayn, and the latter's preëminence was assured in December.

MOLUCCAS, *mo luk'az,* or **SPICE ISLANDS,** a large group of islands belonging to the Dutch East Indies, situated southeast of the Philippine Islands, and having New Guinea on the east, Celebes on the west and Timar on the south. Geographically they are a division of the Malay Archipelago (which see). There are several hundred islands in the group, and they have been in possession of the Netherlands since the beginning of the seventeenth century. They have a combined area of 43,864 square miles, and for purposes of administration are divided into three residences (provinces), Ternate, Amboyna and Banda. These islands are of volcanic origin, high and mountainous, but exceedingly fertile. They produce a great variety of spices (from which they derive the name Spice Islands), fruits, fine woods, birds of paradise, rice and cotton. The chief city and center of trade is Amboyna, on the island bearing that name. Population, about 412,000.

MOMEN'TUM, the quantity of motion that a body has when moving. This quantity depends first on the mass of the body, that is, its size and weight; and second, on the speed with which it moves. A small body, such as a bullet, moving with great velocity, may have a momentum no greater than the momentum of a large body moving very slowly. For example, a four-ounce bird flying at the rate of sixteen feet a second has the same momentum as a two-pound puppy walking at the rate of two feet a second. This principle is usually expressed in the formula: $Momentum = Mass \times Velocity$. The product is expressed in the abstract units of foot-pound-second or centimeter-gram-second in the given direction, which means the momentum of so many pounds or grams of mass moving so many feet or centimeters per second. The unit centimeter-gram-second is that employed in the metric system (which see).

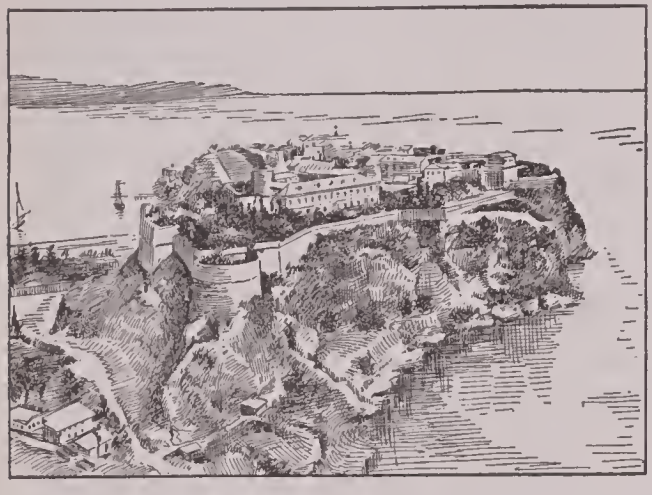
MOMMSEN, *mohm'zen,* Theodor (1817-1903), a German scholar, teacher and writer, the author of one of the finest historical works ever written, *Mommsen's History of Rome.* At the age of thirty-one he was elected professor of law at Leipzig University, but two years later was removed for political reasons. He then went to the University of Zurich in Switzerland as professor of Roman law, and after two years became professor of history at the University of Breslau. From 1858 until his death he was professor of ancient history in Berlin University. He served



THEODOR MOMMSEN
One of the most profound scholars of Germany in the nineteenth century.

as deputy in the Prussian Parliament from 1873 to 1882, when Bismarck was at the height of his power. To the latter's policies he was strongly opposed. Mommsen was a famous archaeologist in the field of ancient Roman inscriptions. His *Roman History,* the first volume of which was published in 1854, is considered a standard reference work by American universities.

MONACO, *mon'a ko,* an independent principality on the Mediterranean coast of France, the smallest in Europe, being only eight square miles in area. Up to 1861 it had an area of fifty square miles and included Mentone and



MONACO AND MONTE CARLO
French in language, but Italian in tradition.

Roccabauna. Owing to financial stress, the greater part was at that time transferred to France for about $750,000. It now consists of Monaco, the capital, Condamine and Monte Carlo; the population is chiefly in these three cities. There is very little industrial life; the principal business of the people of Monaco is in connection with the hotels and the gambling resorts, which attract people from all parts of the world.

Winter resorts are maintained on a magnificent scale. The most famous of these is Monte Carlo, the world's most notorious gambling center, with its costly Casino. The splendor of the gambling halls, together with the fascination of the game of chance, has gained for Monte Carlo a world-wide reputation. Large sums of money are being continually lost there, and jewels and estates are mortgaged to satisfy the demands of this insidious pastime. Suicide is common. A syndicate pays so heavily to the Prince of Monaco for its license to gamble that no tax for the support of the government is placed upon the people.

Emperor Otho I, founder of the Holy Roman Empire, ceded this principality to the ancestors of the Prince of Monaco, and the government has since remained in this family. Population in 1910, 19,121.

Consult Smith's *Monaco and Monte Carlo;* Mayne's *Romance of Monaco and Its Rulers.*

MONARCHY, *mon'ar ki,* that form of government in which executive power is vested in an hereditary ruler. The old idea of monarchy was that the power of the ruler should be absolute, a theory which included the doctrine of the divine right of kings. Changes which were largely the result of the French Revolution have brought into existence the term *limited,* or *constitutional,* monarchy, as opposed to *despotic,* or *absolute,* monarchy. When the power of a ruler is limited either by a legislative body or a constitution, or by both, the state is said to be a *limited* monarchy.

Absolute monarchies are fast disappearing. Russia, long an extreme type of despotism, overthrew absolutism in 1917, and even in Turkey the people are beginning to ask for a voice in the government. The people of nearly all European countries live under limited monarchical forms of government; the exceptions, in addition to the two noted, are the republics of France and Switzerland. See GOVERNMENT.

MONASTERY, *mon'as ter i.* See MONASTICISM, below.

MONASTICISM, *mo nas'ti siz'm,* a form of organized and regulated conduct of life, growing out of one of the deepest instincts of human nature—the love of solitude. This craving to be alone has perhaps manifested itself chiefly as an expression of spiritual life. Among Asiatics the instinct has been peculiarly strong. The ancient Oriental philosophies of asceticism and mysticism led men into solitary life as a condition of that almost utter self-effacement which meant escape from the follies of the world and an entering into union with the omnipotent Creator. Among ancient peoples there were probably no hermit organizations, but many devotees of the oldest religions, in China, India, Tibet and Canaan, lived the life of a recluse, either wholly or in part. Before the time of Christ there was in Judea a society called Essenes, whose members lived an organized monastic life.

Christian Monasticism, which began in the second century after Christ, has developed extensively since that time. In the beginning it was due partly to a desire on the part of Christians to escape persecution or the corruption of society, but was largely the result of asceticism, a desire for self-renunciation. Strangely, and yet not strangely, Egypt was the home of

monasticism, where it was an unforeseen development of hermit life. Among the many solitary travelers up the valley of the Nile was one Saint Anthony, who established himself in an old deserted fort, where he lived in seclusion for nearly twenty years. As others came to know of this saintly man they begged him to be their teacher. He did not effect any sort of organization, but was only the spiritual leader of his followers. They lived alone, or two or

three dwelt together in any convenient hut, doing only such work as was necessary for their daily bread, and giving the greater part of their time to religious devotion. Saint Anthony is known as the father of Christian monasticism.

In the southern part of Egypt about A. D. 315-320, Saint Pachomius not only gathered about him numbers of religious hermits, but organized the first Christian cenobium, or monastery. The members lived together, and the life of each individual of this community was regulated by rules. Saint Pachomius himself was the spiritual leader, or abbot, exercising authority in every matter. About 410 the followers of Saint Pachomius numbered nearly seven thousand. He also founded other monasteries, among them one for women.

Since the invasion of Northern Africa by Mohammedans, these monasteries have gradually decreased until at the present time very few remain, and these are of little importance. With its decline in Egypt, monasticism spread into Syria, Palestine, Mesopotamia, Asia Minor and Armenia. There it took the form of a strange sort of self-denial, of which the penance of Saint Simeon Stylites, immortalized by Tennyson's poem of that name, is a well-known example:

Let this avail, just, dreadful, mighty God,
This not be all in vain, that thrice ten years,
Thrice multiplied by superhuman pangs,
In hungers and in thirsts, fevers and cold,
In coughs, aches, stitches ulcerous, throes and cramps,
A sign betwixt the meadow and the cloud,
Patient on this tall pillar I have borne
Rain, wind, frost, heat, hail, damp, and sleet, and snow.

Saint Basil, who lived during the same period, became known as the father of monasticism in the East through his founding of monasteries in Pontus and Cappadocia. In the early part of the sixth century Saint Benedict reformed the old rules, eliminating Oriental asceticism, made the abbot of the monastery as well as the monks subject to rule, and denied the members the privilege of wandering about from one monastery to another, emphasizing the bonds of their community life and the value of work.

Saint Benedict organized corresponding communities for women, called convents, and placed his sister, Saint Scholastica, in charge of the first. Under the Benedictine rule the monasteries and convents of Europe during the Middle Ages held high the torch of religious faith and were the "cities of refuge" where a troubled world could find sanctuary. In them were preserved the manuscripts of the earliest Christian writings and much of classical and medieval literature.

Some of the most important Orders which adopted the Benedictine rule were the Cluny, Cistercian and Trappist. The Knights Hospitalers of Saint John, the Knights Templar and the Teutonic Knights were military orders growing out of the Crusades against the Mohammedans. The mendicant Orders, the Franciscans, the Dominicans and the Augustinian Hermits, were organized in the first half of the thirteenth century. The Jesuits, the last great Order founded in Europe, became an important agency in preventing the spread of Protestantism and in establishing Church schools for the children of Roman Catholics. The Paulist Fathers were organized in 1858 for missionary work in the United States.

The principal monastic vows are poverty, chastity and obedience. Saint Francis' *Imitation of Christ* and other similar writings of pious monks have been beacon lights to those

ascetics in private life who have set for themselves the ideal of self-denial. G.W.M.

Consult Workman's *Evolution of the Monastic Ideal;* Morin's *Ideal of the Monastic Life Found in the Apostolic Age;* Wheeler's *Women of the Cell and Cloister.*

Related Subjects. The following articles in these volumes will be of interest in connection with the above discussion of monasticism:

Anthony, Saint	Knights Hospitalers
Benedictines	Mendicant Orders
Capuchins	Mercy, Sisters of
Carthusians	Monk
Charity, Sisters of	Nun
Dominicans	Paulists
Franciscans	Templars, Knights
Hermits	Teutonic Knights
Jesuits	Trappists
Knighthood, Orders of	Ursulines

MONCK, *mungk,* CHARLES STANLEY, Fourth Viscount (1819-1894), a British statesman and colonial administrator, Governor-General of Canada under the Act of Union from 1861 to 1867, and then for two years first Governor-General of the Dominion of Canada. He was born in County Tipperary, Ireland, was graduated at Trinity College, Dublin, in 1841, and was called to the bar in the same year. After practicing law for a decade he became active in politics, and in 1852 was elected to the House of Commons, of which he remained a member until 1859. From 1855 to 1858 he was a lord of the treasury.

Although his public career up to the time he was appointed Governor-General of Canada was short, he had won so high a reputation that the appointment received general approval. Canadian affairs were in a critical state. The union established in 1841 was about to break down, and before Monck had been in Canada more than a year or two the government was practically at a standstill, because no party could remain in power for more than a few months. Monck's tact and reasonableness went far to avoid trouble. Largely through his influence George Brown was induced to set aside his personal feeling against Sir John A. Macdonald and join the coalition Ministry in 1864. Monck strongly approved of the Confederation movement and did everything in his power to assist it. In recognition of his services he was made, in 1866, a viscount in the peerage of Great Britain (previously he had been an Irish peer), and when the Dominion of Canada was organized in 1867 was appointed its first Governor-General. He resigned after two years of service. In 1871 he was a member of the commission which effected the disestablishment of the Irish Church, and from 1882 to 1884 was on the commission to carry out the provisions of the Irish Land Act.

VISCOUNT MONCK

MONCTON, *mungk'tun,* a city in Westmorland County, New Brunswick, and, except Saint John, the largest city in the province. It is 185 miles northwest of Halifax and eighty-nine miles northeast of Saint John. Its location in the southeast corner of the province, near the narrow Isthmus of Chignecto, has made it a railroad center. It is the eastern terminus of the Canadian Government Railways (The Intercolonial and the Grand Trunk Pacific), and is the general headquarters for the entire system. They employ in the city from 2,000 to 3,000 people, who receive in wages from $2,000,000 to $2,500,000 a year, and their repair shops are Moncton's largest industrial establishment. The population in 1911 was 11,345; in 1916, estimated, 15,000.

In addition to the government railways Moncton is served by the Transcontinental, operated by the government, and by the Moncton & Buctouche Railway. It is at the head of navigation on the Petitcodiac River, which is navigable for about nine months of the year for vessels drawing twenty-five feet of water. The water commerce, particularly in coal and molasses, is important. Vessels coming up the river are carried by the "tidal bore," which rises to a height of thirty or thirty-five feet. The tides of the Bay of Fundy, into which the Petitcodiac flows, are famous (see FUNDY, BAY OF).

Moncton is the only city in Eastern Canada to burn natural gas as fuel, and it is the center of one of the three large gas-producing fields in the Dominion. It has a large trade in lumber, agricultural implements, hardware, wholesale groceries and other commodities. Its chief manufactures are woolen goods, flour, biscuits, leather, hats, caps and other articles of clothing, wire fences, aerated waters and woodenware of various kinds.

A conspicuous feature of Moncton is the combined city hall and market, completed in

1916. The Y. M. C. A. building, the post office, Aberdeen High School, the Moncton Hospital, erected in 1904, and the offices of the government railways are noteworthy structures. H.V.B.

MONDAY, *mun'day,* the name of the second day of the week, is from the Anglo-Saxon *monandaeg,* which means *the moon's day.* In ancient times each of the seven days was dedicated to a god or goddess, and Monday was sacred to the goddess of the moon.

Black Monday is the name applied historically to Easter Monday, April 14, 1360, when the troops of King Edward III suffered so bitterly from the cold as they lay before the city of Paris that many men died on their horses. The expression has come to be applied to any Easter Monday, as in the following line from Shakespeare's *Merchant of Venice:*

> Then it was not for nothing that
> My nose fell a-bleeding on Black Monday last.

Blue Monday, so called in Bavaria because of the color of the church decorations, is the Monday before Lent. In America, the holiday known as Labor Day (which see) always falls on the first Monday in September.

MONESSEN, *mo nes''n,* Pa., an industrial city in Westmoreland County, in the southwestern part of the state, thirty-nine miles south of Pittsburgh. It is situated on the Monongahela River and is served by the Pittsburgh & Lake Erie Railroad. Monessen was settled and incorporated in 1898, and the increase in population from 11,775 in 1910 to 21,630 (Federal estimate) in 1916 indicates its rapid growth. Only thirty-five per cent of this number are Americans, Slavs, Finns and Italians predominating in the foreign element. The area is about one square mile.

Monessen is noted for its large steel and sheet and tin-plate industries; the former employs over 5,500 people and the latter 1,500. Besides these the city has foundries, machine shops, a woven-wire fence factory and lumber yards; the products of all these are shipped in large quantities. In the vicinity are found deposits of coal and iron ore. The name Monessen associates the Monongahela River with Essen, the Prussian city of steel fame, where are located the great munition works of the Krupps. A.W.B.

MONEY, *mun'i.* If you were to journey to the northwest of Canada, to the farthest of the Hudson's Bay Company's trading posts, you would find a pocketful of coins or five-dollar bills almost useless. If you asked the storekeeper the price of a certain amount of coffee he would answer, "Two and a half beaver skins," and if you then gave him three beaver skins he would hand you a small marked stick for your change. Any person in that district would take the stick from you in payment for supplies, but probably nowhere except at the store could you induce anyone to accept the money which you had brought with you.

In the world's history many different substances have been utilized for money. At first, of course, all exchange was by barter or trade. If one man was a shepherd and his neighbor a fruit-grower, a sheep would be given in return for grapes or olives. But perhaps the owner of the sheep would not want at one time all the fruit that a whole animal would purchase. So the fruit-grower, since in those days no one knew how to write, would give him a number of pretty stones as *tokens* that he still owed him fruit. Or perhaps he would give him a quantity of grain, salt or some other generally desired commodity of equal value to the fruit still due. Some of the American Indians gave wampum or shells as tokens, and the first white settlers in Virginia traded with both wampum and tobacco.

The gold and silver, nickel, copper and paper money of to-day are not different in principle from those older means of exchange. Gold coins are in a real sense like the beaver-skins and the grain, salt and tobacco currency given in return for objects of equal value. The smaller coins, of silver or other metals, are *token money,* like the Hudson's Bay Company's sticks or the

pretty stones and wampum. A piece of paper money is a printed token.

The standard metals for the world's money have been chosen for a number of reasons. First, their value is large in proportion to their weight; they can be more easily carried than bags of salt or beaver skins. Secondly, they are not perishable, like tobacco or corn. Then, too, because they are composed of very small grains they can be made into units of exactly equal value and of any size desired. Last of all, their values change but little from year to year, whereas those of most commodities move up and down from season to season. Gold and silver possess these qualities to a greater degree than any of the other metals. Copper, because it is so heavy, is suitable only for the smallest coins.

Cheap Money and Dear Money. Because we think of everything else as being worth a certain amount of money, it seems strange, at first, to hear that money, too, has price and value. Sometimes the expression *price of money* refers to charges for borrowing it, and means in reality the price of capital, which is explained in these volumes in the article INTEREST. But money itself has a price; that is, a silver dollar is worth a certain amount in gold or paper money, and a paper dollar has its worth in silver or gold. So, too, the money of one country has a price in another. In addition, money as a whole has changing value, and when we read that the cost of living is increasing what we really learn is that the value of a dollar is going down, for if a dollar will buy less than formerly it is in a true sense worth less to us.

Gold and Silver Standards. In 1873 the value of the metal in a silver dollar of United States money was exactly a dollar in gold. Then the price of silver began to decrease, so that at times a silver dollar has been worth only forty cents in gold. Other countries have, of course, had similar experiences, and as a result most of them have adopted a *gold standard.* That is, gold coins have been the basis of all money figures, and silver circulates as token money. The United States has had the gold standard since 1900; Great Britain made it legal in 1816. Few countries now maintain a silver standard.

A change in the relative values of gold and silver sometimes creates difficult situations for a government. Thus, the rise in the price of silver in the spring of 1916 brought the value of the metal in a silver rupee of India, which ordinarily circulates as a token coin, to nearly the legal value of the coin. Had silver risen a very little more, people would have begun to melt the rupees to sell the silver in them, and silver would have been driven out of circulation. This would have been a hardship upon all the people, because there are no gold coins of small amount.

At one time the silver half-dollars and quarters of the United States were worth an equal sum in gold, but after the great discoveries of California gold in 1849, these coins were more valuable than gold coins and ceased to circulate, because people saved their silver and spent their gold, as explained under the heading GRESHAM'S LAW. For this reason all coins less than one dollar were made "token" money by putting less metal into them. The amount of metal in the minor coins of the United States and Canada is as follows:

UNITED STATES

COIN	GRAINS	FINENESS *	FACE VALUE	VALUE OF PRINCIPAL METAL†
Silver				
Dollar	412.5	.900	$1.00	$ .50
Half-dollar	192.9	.900	.50	.23
Quarter-dollar	96.45	.900	.25	.116
Dime	38.58	.900	.10	.046
Copper				
Five cents	77.6	.750	.05	.002
One cent	48.	.950	.01	.001

CANADA

Silver				
Dollar	360.	.925	1.00	.44
Half-dollar	180.	.925	.50	.22
Quarter-dollar	90.	.925	.25	.112
Dime	36.	.925	.10	.044
Five cents	18.	.925	.05	.02
Bronze (copper, tin and zinc)				
One cent	87.5		.01	.002

*Fineness .900 means that only 900 out of every 1,000 grains are the metal which gives the coin its value. The balance of the metal in United States silver coins is copper, in the five-cent piece nickel, and in the one-cent piece tin and zinc.

†These values are constantly changing.

Paper Money. Since paper, in itself practically worthless, becomes money only because of government decree, it follows that its real value depends largely on the confidence which people have in the promises of the government. The total amount of it which can be issued is not controlled, as with gold and silver, by the output of mines, but by the quantity which the government determines to print. If too much paper money is issued, the currency of a country is said to be *inflated;* like a balloon, it has no solid backing, and if expanded too far the

financial scheme may burst and cause panic. Thus, the paper money issued during the Revolution of the American colonies fell in value till in 1782 five dollars of it was worth only one cent in silver.

CONTINENTAL CURRENCY
Form of the paper money of Revolutionary times.

There are two kinds of paper money. The first comprises *silver* and *gold certificates,* which are merely receipts for actual metal in the possession of the government, and are issued because convenient to carry. Any person may take these silver and gold certificates to the national Treasury and get metal money for them. Because of this easy and sure exchange people have full confidence in them. But most paper currency is only partly, if at all, secured by reserves of gold or silver. So long as the people think the reserve is large enough to pay any of them who may want to change their paper for metal, the paper money retains its face value, but if the reserve dwindles or disappears, or people lose confidence in the government the value of paper money suffers. Sometimes, in order to prevent the exhaustion of their reserves, countries are obliged to *suspend specie payment.* This happened in the United States after the War of Secession, as told in the article SPECIE PAYMENTS, RESUMPTION OF.

Currency

The money which circulates in a country is commonly called its *currency.* The currency of the United States and Canada includes, besides the token coins in the table above, gold coins and paper money. In both countries the gold coins contain 25.8 grains of metal .900 fine for each dollar, and the authorized coins are $20, $10, $5 and $2.50. In the United States they are called double-eagles, eagles, half-eagles, and quarter-eagles. Gold dollars were coined prior to 1890. The paper money of the two countries is as follows:

United States — *Secured By*
Gold Certificates,
$10, up ..... Equal amount of gold.
Silver Certificates,
$1, $2 ..... Equal amount of silver dollars.
United States
Notes, $5, up.. Gold reserve.
National Bank
Notes, $5, up... National bonds.
Federal Reserve
Notes ..... Gold and commercial paper.
Canada
Dominion Notes,
25¢ to $5..... Gold and bonds.
Bank Notes, $5,
up ..... All bank assets.

Since the purchasing power of a dollar depends upon the relation of the supply of currency to the demand for it, it is necessary, in order to prevent violent changes in the value of money, to establish a currency whose supply will increase and decrease with the demand—that is, be elastic. In prosperous times, when credit is extended to nearly everyone and checks serve in most business transactions and money circulates rapidly, not so much currency is needed. But when it is feared that there may be a business crisis, when merchants refuse credit to their customers, and people withdraw money from the banks and are afraid to part with what they have, then new currency must be issued. It is to gain elasticity that the Federal Reserve Banks and the banks of Canada are permitted to issue notes partly secured by the promissory notes of bank customers.

The standard moneys of the important countries are given in the following table, with values in United States and Canadian money. The standard is gold in every case, unless another metal is mentioned:

COUNTRIES WITH UNITED STATES AND CANADIAN STANDARD

COUNTRY	STANDARD	VALUE
British Honduras.	U. S. dollar.....	$1.00
Cuba	peso	1.00
Nicaragua	cordoba	1.00
Panama	balboa	1.00
Philippines	peso	.50
Santo Domingo...	U. S. dollar.....	1.00

COUNTRIES WITH BRITISH STANDARD

Bolivia	peso	$0.973
Colombia	dollar	.973
Ecuador	condor	4.8665
Great Britain....	pound sterling	4.8665
Peru	libra	4.8665

COUNTRIES WITH STANDARD OF LATIN MONETARY UNION

Belgium	franc	$0.193
Bulgaria	lev	.193
France	franc	.193
Greece	drachma	.193
Italy	lira	.193
Rumania	leu	.193
Serbia	dinar	.193
Spain	peseta	.193
Switzerland	franc	.193
Venezuela	bolivar	.193

COUNTRIES WITH SCANDINAVIAN STANDARD

Denmark	krone	$0.268
Norway	krone	.268
Sweden	krona	.268

COUNTRIES WITH VARIOUS STANDARDS

Argentina	peso	$0.965
Austria-Hungary	krone	.203
Brazil	milreis	.546
Chile	peso	.365
China	customs tael, silver	.705
Costa Rica	colon	.465
Germany	mark	.238
Haiti	gourde, nickel, about	.167
Honduras	peso, silver	.467
India	rupee	.324
Japan	yen	.498
Mexico	dollar or peso	.498
Netherlands	guilder or florin	.402
Paraguay	dollar, paper	a few cents
Persia	kran, silver, about	.080
Portugal	escudo, or milreis	1.080
Russia	ruble	.515
Siam	tical	.378
Turkey	piastre	.044
Uruguay	peso, gold	1.034
Guatemala	peso, paper	a few cents

The value of silver coins in the above table was found by assuming the silver in the United States dollar to be worth 50 cents. C.H.H.

Consult White's *Money and Banking;* Fisher's *The Purchasing Power of Money;* Howard and Johnson's *Money and Banking.*

Related Subjects. The following articles in these volumes will give much additional information on this important subject:

Banks and Banking
Bimetallism
Cent
Check
Coinage
Coins, Foreign
Credit, Letter of
Crown
Denarius
Dollar
Ducat
Eagle
Economics
Farthing
Fiat Money
Florin
Franc
Greenbacks
Gresham's Law
Guinea
Interest
Legal Tender
Livre
Milreis
Mint
Money Order
Negotiable Paper
Note
Penny
Peseta
Peso
Piaster
Pine-Tree Shilling
Ruble
Rupee
Rural Credits
Shekel
Shilling
Sovereign
Talent
Thaler
Wampum
Yen

MONEY ORDER, sometimes called *postoffice order,* a safe and convenient form for sending any sum of money up to $100, from one place or person to another. Such an order is secured at a department of the United States government postoffice by paying the amount desired to be sent, and a stated commission based upon the size of it. The rates are as follows:

AMOUNT	COMMISSION
Not exceeding $2.50	3 cents
Over $2.50 to $5.00	5 "
" $5 to $10	8 "
" $10 to $20	10 "
" $20 to $30	12 "
" $30 to $40	15 "
" $40 to $50	18 "
" $50 to $60	20 "
" $60 to $75	25 "
" $75 to $100	30 "

If Mr. A. of New York City sends a money order to Mr. B. of Denver, Colo., it is payable at the Denver office; but if Mr. B. happens to be leaving that city when he receives it he may present it, on or before the thirtieth day following the date at which it was issued, at any money-order office in continental United States except Alaska, and will receive payment on it. If, however, he presents it after that date, but within one year from the last day of the month in which it was issued, it can be paid only at the office in Denver, or in New York City, where the money was deposited. But if Mr. B's postoffice order is lost or destroyed before he has cashed it, the receipt given Mr. A by the New York City office may be presented within a year either at the latter place or at Denver, where the order will be cashed, or a *stop order* may be issued, stopping payment of the amount to the finder of the lost money order.

International money orders are payable in almost any part of the world. The commission for sending any sum ranging from one cent to ten dollars is ten cents, and for every extra ten dollars or fraction of that amount an additional ten cents is charged.

Canadian Orders. The costs of Canadian domestic money orders, and of those sent to any of the following countries are given herewith: Antigua, the Bahamas, Barbados, Bermuda, British Guiana, Cayman Islands, Cuba, Dominica, Grenada, Guam, Hawaii, Isle of Pines, Jamaica, Montserrat, Nevis, Newfoundland, Panama Ca-

nal Zone, Philippine Islands, Porto Rico, Saint Christopher, Saint Lucia, Saint Vincent, Tobago, Trinidad, Turks Islands, Tutuila, Virgin Islands and the United States:

AMOUNT SENT	COMMISSION
Up to $10	5 cents
Over $10 and up to $30	10 "
" $30 " " " $50	15 "
" $50 " " " $60	20 "
" $60 " " " $100	25 "

Rates for sending Canadian postoffice orders payable in the British Isles, British possessions and in all other lands where such may be drawn, except those countries mentioned, are, for sums up to five dollars, five cents; over five and up to ten, ten cents, the cost for each extra ten dollars or fraction of that amount being an additional ten cents. M.K.

MONGO'LIA, a vast section of Eastern Asia, belonging to China, bounded on the north by Siberia and on the south by the province of Sin-Kiang, which comprises Turkestan, Kulja and Kashgaria, all Chinese dependencies. It stretches from the Kinghan Mountains on the east to the Tarbagatai range on the west and covers an area of about 1,367,600 square miles—nearly half that of the United States. The heart of the region is occupied by the Desert of Gobi. The native inhabitants, wandering Mongols and Kalmucks, are little given to agriculture, but roam through the desert with camels, horses and sheep. The chief town is Urga, from which the caravan trade is carried on with China across the Gobi Desert, goods being transported by camels to Kiakhta, a Siberian town lying about 100 miles from Lake Baikal.

LOCATION MAP

Outer Mongolia (Khalkha, the Kobdo district and Urianghai) declared its independence on November 3, 1912, after the outbreak of the Chinese Revolution, and proclaimed Jebtsun Hutuku emperor. An agreement was reached in Peking on November 5, 1913, between Russia and China, whereby Russia recognized Outer Mongolia as part of Chinese territory; China, in turn, recognized the autonomy, or self-government, of Outer Mongolia. In September, 1914, Russia recognized Mongolia's right to construct its own railways and lent coöperation in finding the capital for their construction. Concessions were also granted to build telegraph lines from the Irkutsk district in Southern Siberia to the Mongolian line at Uliasutai. Since March, 1915, Mongolia has had its own legal currency. Population, about 2,600,000.

Consult Kendall's *A Wayfarer in China.*

MONGOLIAN, RACE, or **YELLOW RACE.** See RACES OF MEN.

MONGOLS, *mong'golz,* a wandering, warlike tribe of people, a branch of the Tartar race, whose original home was the plains of Central and Eastern Asia. Early in the thirteenth century countless hordes, led by their first great chieftain, Genghis Khan, began a devastating march through Northern China, Turkestan and Persia, slaughtering, burning and pillaging with inhuman cruelty (see GENGHIS KHAN). In the reign of Oktai (died 1241), son and successor of Genghis Khan, the invaders pressed into Europe and devastated a large part of Russia, Poland and Hungary. Just when the civilization of Western Europe seemed doomed to be destroyed, Oktai died and the merciless warriors were called home.

Kublai Khan (1214-1294), one of the most famous successors of Oktai, set up his royal court in China at Cambalu, the modern Peking. There the celebrated traveler Marco Polo (see POLO, MARCO) lived for many years. When Kublai Khan died his empire was separated into several weak kingdoms. These were reunited by the great Timur, or Tamerlane (1336-1405), a powerful monarch who extended his dominions over nearly all Asia and ruled as the lord of the earth from his capital city, Samarkand. See TIMUR.

The great empire of Timur fell to pieces after his death, but a powerful Mongol state, known as the Kingdom of the Great Moguls, was established in India in 1525, by Baber, one of his descendants. Magnificent courts were maintained at Delhi and Agra, and a Mogul emperor, Shah Jehan (1628-1658), erected at the latter city, as a mausoleum for his favorite wife, one of the most beautiful buildings in the world (see TAJ MAHAL). The Mogul kingdom in India lasted until the eighteenth century, when it was destroyed by the English. The inhabitants of Mongolia (see above), a colonial possession of China, are descendants of the ancient tribe.

MONGOOSE, *mong'goos,* or **MUNGOOSE,** a small weasel-like animal of a yellowish-gray color and long, stiff hair, notable for its skill

in destroying mice, rats and snakes. It is about sixteen inches long and has a fierce disposition, but is easily tamed. It seizes and kills snakes, the poisonous cobra included, and avoids the stroke of the serpent by its agility. In parts of the world it has been colonized to destroy vermin, but it increases in numbers so rapidly that birds, poultry and small animals have suffered severely. For the latter reason, since 1902 the bringing of a live mongoose into the United States has been prohibited by law.

MONITOR, *mon'i ter,* the name of a species of large lizards, sometimes wrongly called the *iguana* by Europeans. They are the largest lizards of the Eastern hemisphere, and live in the rivers of Egypt, India and Africa, where they are greatly feared by the natives. These creatures often attain a length of six feet and are greenish-gray or brown on the back, with fine yellow lines and black stripes on the head and neck. Young crocodiles or crocodile and turtle eggs form the principal food of the monitor, while the big crocodile is its greatest enemy. The natives believe that these lizards warn their fellows with a hiss and plunge down into the water when a crocodile approaches; the name monitor, or *warning lizard,* is derived from this habit. See Lizard.

MONITOR AND MERRIMAC, *mer'i mak,* the names of two ironclad warships that engaged in a naval encounter in Hampton Roads, Va., on March 9, 1862, during the War of Secession. The *Monitor* was the invention of Cap-

THE HISTORIC SCENE
Engagement of the first iron-clad ships of war, in Hampton Roads.

tain John Ericsson, and was the first successful ironclad vessel in the United States navy, being constructed at Greenpoint, L. I., between October, 1861, and January, 1862.

The length of the *Monitor* was 172 feet; it lay so low in the water that its flat iron-plated deck was but two or three feet above water level. The revolving turret contained two eleven-inch guns and was made of iron so thick that it could stop a heavy cannon ball. The *Monitor* was launched on January 30, 1862, and sailed on March 6 for Hampton Roads to meet the *Merrimac,* the Confederate ironclad ship which had destroyed a number of Federal vessels in the harbor and had been rechristened the *Virginia.* The two vessels met on March 9, and after a four hours' battle the Monitor forced her opponent to retreat to Norfolk in a disabled condition; the broadsides fired by the *Merrimac* produced no effect on the "cheesebox on a raft," as the *Monitor* had been ironically nicknamed.

This naval engagement demonstrated the value of armored vessels; it put an end to the building of wooden ships of war, and these comparatively simple vessels proved the forerunners of the 25,000-ton steel battleships of the present day. See Ericsson, John.

MONK, *mungk,* originally a man who abandoned the world and retired to solitary life for religious reasons. At the present time the term is applied to any member of a community of people, men or women, who have retired from the world because of religious vows which they have taken. It is probable that the first order of Christian monks originated in Northern Egypt in the third or fourth century. The members lived solitary lives, devoting themselves to the study of the Scriptures, meditation and prayer. Later monks began to gather themselves into communities and to erect monasteries. There are now many monastic orders, especially in the Roman Catholic Church, and their members are found in all lands. See Monasticism.

MONK, or **MONCK,** *mungk,* George, first Duke of Albemarle (1608-1670), an English soldier famed for his share in the restoration of the Stuarts to the throne of England after the execution of Charles I. Throughout his entire military career, which was begun to escape the consequences of a thrashing given by himself to an officer who had wronged his father, he was distinguished for his ability to fill difficult places, for his keen judgment and for his fearless energy. As a soldier he served in Spain, Holland, Ireland, Scotland and England. During the struggle between Parliament and Charles I, Monk held a command under Cromwell in Scotland, and remained there to complete the union of Scotland with England. After the death of Cromwell, he secretly waited for the right time to advance to London and restore the crown to the Stuart king, Charles II. This he eventually did without shedding blood, by calling together the Presbyterian members who had been expelled from Parliament in 1648, thus securing a majority favorable to the restoration. In recognition of this service Charles II created him Duke of Albemarle. See Commonwealth of England.

MONKEY, *mung'ki,* the name of a group of animals that possess special interest for young and old because of their very remote resemblance to human beings in appearance and in some of their actions. The monkey cage at the zoo or circus is a center of interest, for everybody likes to watch the serious-faced little creatures, eating peanuts, cleaning each other or playing mischievous pranks, and all the time seeming to be deep in thought. The name is supposed to be derived from an Italian word meaning *old woman,* and refers, apparently, to the resemblance of a monkey's face to that of a wrinkled old lady. Though the name is applied in popular language to a wide variety of manlike animals, strictly speaking monkeys constitute the group with long tails and short, narrow faces. The larger, tailless members of the family are called *apes;* to this division belong the gorillas, chimpanzees, orangutans and gibbons.

COMMON MONKEY
The monkey pictured above in the act of catching a fly is of the species that children commonly see in zoölogical gardens and in menagerics.

Monkeys at Home. Monkeys in their homes in the tropical forests are even more interesting than in the zoo. They live in pairs, as do men and women, and their love for their families is greater than that of many human beings. They travel in groups, and when they reach a stream which it would be difficult for the mothers and children to cross, the fathers form themselves into a chain, swing from the limb of a large tree, and make a living bridge to another tree on the opposite bank. This feat is easy for South and Central American monkeys, which have long, strong tails, almost as useful as a fifth hand. All monkeys have in effect four hands, for their toes are thumbs and fingers. Their arms are often longer than their legs. The usual food of monkeys is fruit and insects, but sometimes includes eggs, young birds and reptiles. They are very cleanly animals, and the mothers are said to bathe their children in the river every day, when possible.

Some monkeys do not thrive in captivity, and all are very sensitive to cold. It has been found that in the summer they endure captivity better when placed in outdoor cages than in enclosed ones. They are as a rule easily tamed, never, even in the jungle, fighting a man unless in self-defense. The Old World monkeys are especially clever, but almost any monkey is quick to learn simple tricks such as an organ-grinder teaches his pet. In India they are considered sacred, and are never interfered with in the mischievous pranks they like to play, even when these cause great annoyance.

Monkeys as Pets. Some very interesting facts are recorded by those who have had opportunity to study the ways of pet monkeys. They respond readily to kind treatment and show their affection by caresses and kisses. Monkeys try to talk to their owners both by gestures and by sounds, and they seem to be able to communicate with one another with ease. One investigator who spent many years in studying pet monkeys recorded the speech of several of his little captives by means of a phonograph. He found that in some cases there were slight inflections in the sounds used. Usually monkeys of one species do not try to acquire the speech of those of a different species, but there are exceptions to this rule. They vary their talk according to their emotions, sometimes screaming with anger or alarm, and again uttering low, plaintive sounds which may mean affection, sorrow or repentance. The funny chattering of the monkeys in the zoo is of course familiar to everyone. Whenever these little creatures find a home in the household they should be given toys, for monkeys are generally happy if they have something to play with and plenty to eat.

Varieties. American monkeys, most of which live in Brazil, Guiana, Venezuela, Central America and Mexico, are easily distinguished from those of Africa and Asia by the greater breadth of their noses. They also have two more teeth in each jaw. The best-known species is the *capuchin,* light-colored on the top of the head, named from the French word for *hood;* it is also called the *sapajou.* There are also the *howler,* whose name is taken from its peculiar cry and is well deserved, and the *spider monkeys,* long and slender, whose tails are stronger than those of any other species. The monkeys in the Eastern hemisphere are more varied in color than the American, some having touches of brilliant red, blue and yellow, in addition to the usual green, gray or brown. Perhaps the strangest looking of all monkeys is the *proboscis,* or trunk, monkey of Borneo, whose nose is a miniature of an elephant's trunk.

M.S.

Consult Garner's *Apes and Monkeys, Their Life and Language;* Elliot's *A Review of the Primates.*

Related Subjects. The reader is referred to the following articles in these volumes:

Ape	Loris
Aye-aye	Marmoset
Howlers	Sapajou
Lemur	

MONMOUTH, *mon'muth,* BATTLE OF, an important battle fought at Monmouth, N. J., on June 28, 1778, during one of the darkest hours of the Revolutionary War. The American army, commanded by Washington, had suffered during the preceding winter at Valley Forge, while the British army was in command of Sir Henry Clinton. On June 18, 1778, Clinton's army left Philadelphia and retreated across New Jersey, while Washington with 8,000 men followed in the rear, in order to attack the left wing of the enemy. General Charles Lee, with a force of 6,000 troops, was detailed by Washington to assail Clinton until his arrival. Lee ordered an attack, but the assault was so mismanaged that his army was thrown into confusion and a retreat was begun. When Washington arrived he personally took command, rallied the forces and renewed the attack. After the day's battle was over Clinton withdrew his army under cover of night to the heights of Middletown. Though the battle was indecisive, the practical advantage lay with the colonial forces. The American loss was 362 wounded and killed, and the British loss 416. This battle ended the war in the middle colonies.

MONMOUTH, JAMES, Duke of (1649-1685), a pretender to the throne of England, who, to attain his ambition, headed an insurrection which bears his name. He was the natural son of Charles II and was educated in France. On the restoration of the Stuarts, after the death of Richard Cromwell, his father recalled him to England and created him Duke of Monmouth. In 1663 he married Anne, daughter of the Earl of Buccleuch, and assumed his wife's name of Scott. He became known as the Protestant duke, and the Protestants aimed to place him on the throne instead of the legal heir, James, Duke of York, but they were unsuccessful.

After the discovery of the Rye House Plot (which see), in 1663, he fled to Holland, but when the Duke of York ascended to the throne as James II, he gathered a force in the Netherlands and resolved to invade England and demand the crown. He landed at Lyme, in 1685, and issued a proclamation declaring James to be a usurper, tyrant and murderer. Utterly routed at the Battle of Sedgemoor, Monmouth was taken into the presence of his uncle, the king, whom he begged piteously but in vain to spare his life. James ordered him sent to the Tower, and on July 15, 1685, at the age of thirty-six, he was executed. After his death there were no further attempts at insurrection, and his followers paid a fearful price for their loyalty to him in the punishment meted out by the cruel Judge Jeffreys (see JEFFREYS, GEORGE).

MONMOUTH, ILL., the county seat of Warren County and a manufacturing city, situated in the northwestern part of the state. Galesburg is sixteen miles northeast, Burlington is forty-eight miles southwest and Chicago is 179 miles northeast. Transportation is provided by the Chicago, Burlington & Quincy and Minneapolis & Saint Louis railways, and connection is made with the Santa Fe Route by interurban electric lines. Monmouth was settled in 1836 and was incorporated in 1852. Locally it is known as the "Maple City." The population increased from 9,128 in 1910 to 10,177 in 1916 (Federal estimate). The area is two and one-quarter square miles.

The country surrounding Monmouth is a good farming region, and there is also coal-mining. Pottery and stoneware rank first in the list of manufactures, one establishment being among the largest of its kind in the United States. Agricultural implements, sewer pipe, drain tile, cotton mittens and cigars are prominent among the other products of the city. A $150,000 Federal building, a courthouse, Monmouth Hospital and a $150,000 high school are buildings worthy of note. Besides its public schools, the city has the Warren County Library, containing nearly 40,000 volumes, a business college and Monmouth College (United Presbyterian), established in 1856. J.H.M.L.

MONOCOTYLEDON, *mon o kot i le'dun.* See COTYLEDON.

MONOMANIA, *mon o ma'ni a,* a term derived from the Greek words *monos,* meaning *single,* and *mania,* meaning *madness,* is applied to a form of insanity in which the mind of the patient is deranged on a single subject, or on one idea. It is sometimes called insanity, and often takes the form of belief in annoyance or persecution. The physical condition of the patient is generally normal, and those suffering from a mild form of monomania usually obtain help in a properly-conducted hospital for the insane. One who has become obsessed by a subject so that he can talk about little else, and

who holds extreme views in regard to it, is derisively spoken of as a "monomaniac." See INSANITY.

MONOMETALLISM, *mo no met' al iz'm.* See BIMETALLISM.

MONONGAHELA, *mo non ga he' la,* **RIVER,** the larger of two streams which unite to form the Ohio River, the other being the Allegheny (which see). The Monongahela is formed by the confluence of the Tygart and West Fork rivers, in Marion County, Va. It flows northeast in an irregular course across the boundary of Pennsylvania to the mouth of the Cheat River, and then north until it unites with the Allegheny at Pittsburgh. The Cheat and the Youghiogheny are its chief branches, the latter entering it at McKeesport, and it drains an area of over 7,300 square miles. Its length is about 150 miles, excluding its branches, and by means of a series of locks and dams it has been made navigable from Fairmont in West Virginia to its junction with the Allegheny. It traverses a fertile country in which bituminous coal is found. The first glass factory west of the Alleghany Mountains was built at New Geneva, on the Monongahela. Near its junction with the Allegheny River the army of Braddock was defeated in 1755 in the French and Indian War (see FORT DUQUESNE).

MONOPOLY, *mo nop' o li,* the exclusive right to deal in some commodity or to trade in a certain market. During the seventeenth and eighteenth centuries it was common for European sovereigns to grant such coveted privileges to persons or corporations, and the greatest variety of operations were conducted in this way. Such special privileges are now generally regarded as contrary to the general welfare of a community or state. They worked a great hardship on the people of the early modern period, because prices were not regulated by open competition but were fixed according to the will of the owner. The greatest of the English monopolies was that enjoyed by the powerful East India Company, which had the exclusive right, by government grant, to trade privileges in India. See EAST INDIA COMPANY.

At the present time monopolies of the kind mentioned are not encouraged by enlightened governments, but monopolies of another sort have survived. The great trusts of America came into being as the result of the efforts of a group of men to control markets and to regulate the prices of the commodities in which they dealt (see TRUSTS). Monopolies are also created by buying up the available supply of any commodity, such as valuable ore lands, oil wells, etc., and it was to prevent such misuse of natural resources that the conservation movement had its origin (see CONSERVATION). It is becoming an established principle that industries which are recognized as monopolies must be subjected to public control, so the owners may reap only reasonable profits. Certain kinds of public service may be rendered most satisfactorily by monopolies created by franchise, such as telephone and street-railway service in cities. These are called *natural* monopolies. The modern tendency is either to subject them to rigid regulation or to operate them as public properties. See MUNICIPAL OWNERSHIP.

Consult Levy's *Monopoly and Competition;* Ely's *Monopolies and Trusts.*

MONORAIL, *mon' o rayl,* SUSPENDED. In 1901 a German engineer, Eugene Langen, completed an electric railway a little over eight miles long connecting the towns of Eberfeld and Barmen, near Cologne, and introduced a

MONORAIL CONSTRUCTION

new method of construction. He suspended a single rail—hence the name monorail—by means of trusses from curved arches; he put the trucks on the top of the car, one at each end, each of two wheels placed tandem, that is, one after the other. These flanged wheels ran on the suspended rail. The truss work supporting the rail is on one side of it, for the other side must be clear to allow the fastenings supporting the car to reach up to the trucks. It appears at first glance to be a dangerous device, but the center of gravity of the car is under the supported rail. The cars used on this German road are thirty-eight feet long, eight feet wide and seven feet high; they weigh twelve tons. At stations where passengers enter and leave the car, the latter is supported by guard rails, to prevent its swaying.

The advantages of the monorail are cheaper construction and operation, safety, greater speed and much less noise. The line admits of sharp curves, for the car having a pendulum

motion swings out as it rounds curves and comes to its usual position with no jar. The German line is an elevated one running above the streets and part of the way swings out over a river, but the same principles could be applied to the ordinary surface car, hanging only a foot or so from the ground.

In the United States a Massachusetts company began experimenting with a like device in 1914, attempting to improve upon the original German model.

MONOTYPE, *mon' o tipe,* a delicate and intricate machine which casts and sets type, one letter at a time, as a compositor would take them from his case and arrange them into words. It is one of the two chief kinds of type-casting and setting devices, the other being the linotype, which differs from the monotype in that it casts and sets type in a solid bar of metal the length of a line of print (see LINOTYPE).

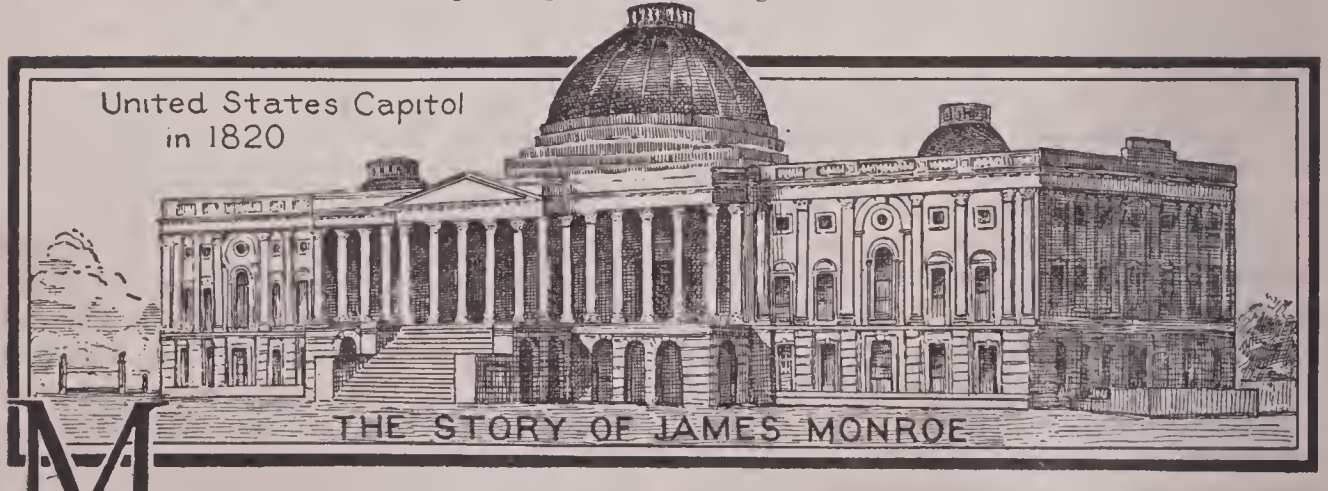
The monotype is used in setting the type for fine books and in any kind of publishing where a more leisurely process is possible than that followed in the great metropolitan newspaper offices. When the news is received "hot and hot," as the saying is, and edition follows edition with bewildering rapidity, it is necessary to use such a machine as the linotype, which produces printing type in response to a single pressure of the operator's finger. The monotype does not do this. It is made in two parts, and two distinct processes are required to produce the type.

One part of the monotype is a machine looking somewhat like an ordinary typewriter, but having a much larger keyboard, containing all the letters and characters used in printing—257 in all. By pressing the keys, the operator releases tiny metal punches, which make perforations in a paper ribbon. At the end of each word a spacing key is struck, and when the line is nearly filled out, a bell warns the operator that he will have to begin a new line. The keyboard of the monotype turns out, not type, but only a paper ribbon with perforations.

The second part of the machine is much more complicated in structure, and to the inexperienced eye the things that can be done with it suggest a kind of magic. The ribbon, with its many tiny holes, is fed into the casting machine backwards. It passes over a board having on its surface many small perforations exactly corresponding to all that may be punched in the ribbon. When any perforation or series of perforations passes over similar holes in the board, a jet of compressed air operates a little piece of mechanism, which, as deftly as any human printer, picks up the proper matrix—the mold from which letters are cast—and carries it to the casting box, where it forms the letter in melted type-metal. The newly-made letter is carried to a galley; letters become words, words extend into lines, and when a line is finished the machine properly spaces it.

One of the advantages of the monotype is that if errors are made in a line or word, they can be corrected just as in hand-composition, since all the letters and spaces are separate. In the case of the linotype, on the contrary, the solid line containing a fault has to be recast. When operated by a skilled workman the monotype is capable of doing high-class work representing a wide range of type, including large advertising type and borders in varying designs.

G.B.D.



MONROE, *mun ro',* JAMES (1758-1831), an American statesman, fifth President of the United States. Monroe's election to the Presidency was the climax of a long public career in the course of which he held almost every possible public office. Beginning as a member of the Virginia assembly, he was in turn a member of the Congress of the Confederation,

again a member of the assembly, a United States Senator, governor of Virginia, minister to France, Great Britain and Spain, Secretary of State and finally President. As President he was responsible for the announcement of the policy which is now known as the Monroe Doctrine (which see), a principle which for nearly a century remained the basis of the foreign policy of the United States. Monroe was President during the "era of good feeling" which followed the War of 1812. The credit for the prosperity which accompanied his administration does not belong to him alone, but there is no doubt that he deserves much of it. Monroe's administration is noteworthy for the permanent stamp of independence it left on the nation. Washington and the heroes who fought at Bunker Hill, Brandywine and Yorktown had succeeded in establishing an uncertain independence for the United States—how uncertain the first ten years of the nineteenth century showed clearly. Monroe made that independence permanent, and transformed the United States into a self-respecting, mature nation. As a man he may sometimes have been untactful. As a public servant he was faithful to his country and his party, and as a statesman he was devoted, throughout his life, to his ideal of a greater and better nation.

His Youth. James Monroe was born in Westmoreland County, Virginia, on April 28, 1758. His family was of Scotch origin, although for many generations resident in Virginia. At the age of sixteen he entered the College of William and Mary, at that time without question the most flourishing institution of its kind in the South, if not in the whole country. College studies, however, were cut short by the Revolutionary War. With some thirty fellow-students and three professors Monroe joined the young men who were hurrying to Washington's headquarters from every section.

His Brief Military Career. Monroe was given a commission as lieutenant in the Third Virginia Regiment, which was stationed near New York City. He took part in the battles of Harlem Heights, White Plains and Trenton, being wounded during the last. In campaigns of the next two years he was a volunteer aide on Lord Sterling's staff, and with the rank of major fought at Brandywine, Germantown and Monmouth. As a soldier Monroe was not a success for reasons which are still uncertain. His conduct was above reproach, and he had been mentioned with favor and praise by General Washington, yet he won no substantial promotion. In 1778 he was given the rank of lieutenant-colonel and was sent to Virginia to raise a new regiment. This was not an important task, but it had an unexpectedly great influence on Monroe's career. It gave him a chance to make the acquaintance of Thomas Jefferson, who was then governor of Virginia, and out of this acquaintance grew an intimacy which had a share in directing Monroe's later career at almost every turn.

Monroe as a Legislator. After 1778 Monroe's military services were negligible. In 1782, however, he began his long career as a public servant by winning a seat in the Virginia assembly. In the next year he was transferred to the Continental Congress, in which he was a delegate for three years (fourth, fifth and six Congresses). During this period he was particularly active in the discussion of the territorial and boundary disputes which followed the end of the Revolutionary War. He favored the development of the West, and merely to inform himself of conditions there, made two trips west of the Alleghanies. It is interesting, however, that he was continually fearful lest the United States become a monarchy, and he fought every move to strengthen the national government. Thus he was naturally an Anti-Federalist first, and later a Democratic-Republican. See Political Parties in the United States.

JAMES MONROE

He will always be remembered for his state paper, in the form of a message to Congress, in which the "Monroe Doctrine" was announced to the world.

At the end of his third term in the Continental Congress Monroe determined to retire from public life and settle down to practice law. This he was not permitted to do. Instead he was promptly elected again to the Virginia assembly, in which he sat for four years. In 1788, in the convention called to consider the Federal Constitution, Monroe allied himself with Patrick Henry in opposition, and tried in vain to prevent ratification. In 1790 the assembly elected him to fill a vacancy in the United States Senate, in which he generally sided with the Anti-Federalists and earnestly opposed the policies of the Washington administration.

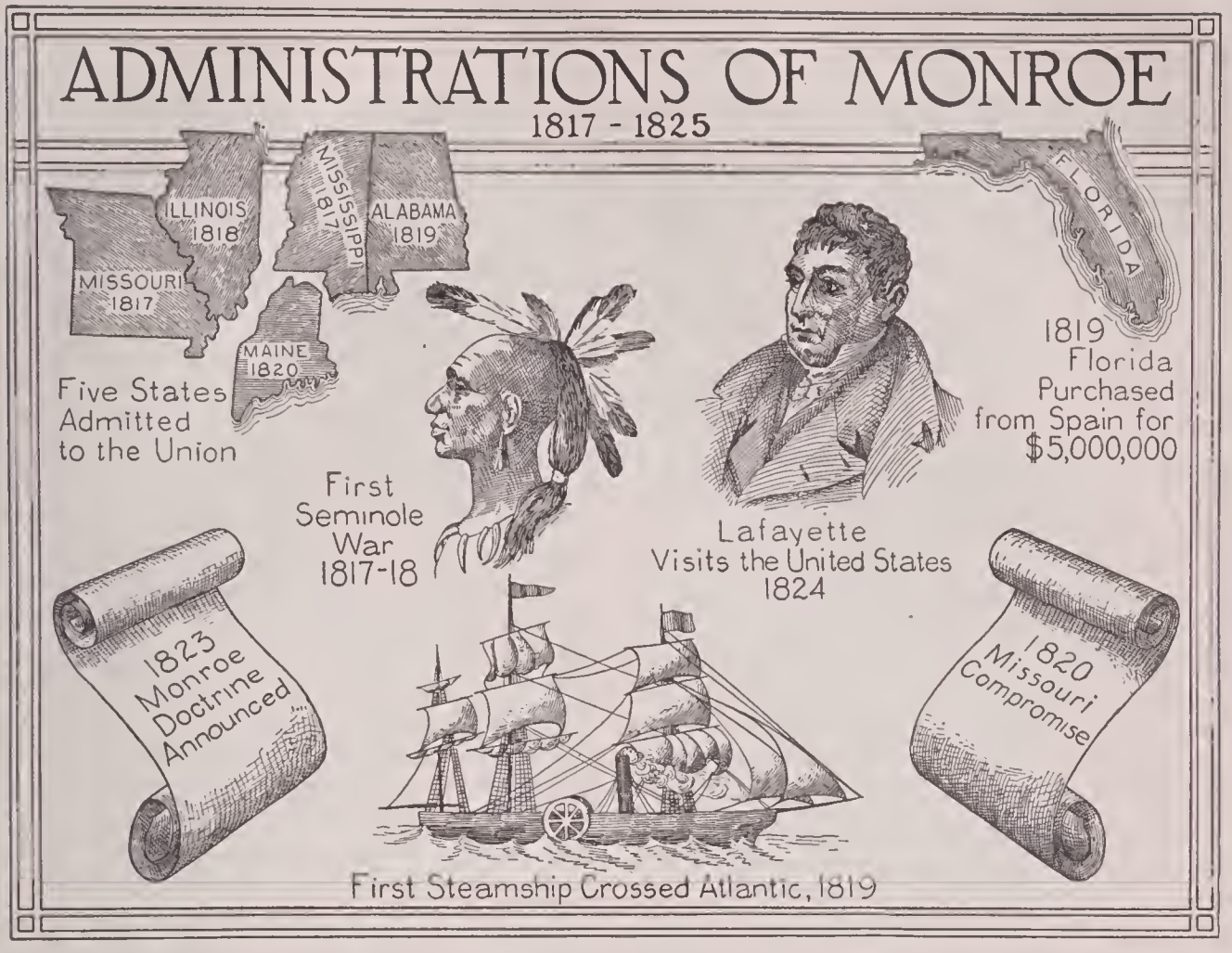
As a Diplomat. The second period of Monroe's public career is the diplomatic phase. During his term in the Senate Monroe was an outspoken opponent of Washington's policies, but the President nevertheless appointed him in 1794 to succeed Gouverneur Morris as minister to France. At the same time John Jay, the Federalist, was sent to England. Thus Washington wisely distributed the balance between the two political parties. Monroe did not perform his duties to the entire satisfaction of the President. He reached Paris just after the fall of Robespierre, and was officially received by the Convention on August 15, 1794. Apparently overcome for the moment by his enthusiasm, he addressed the Convention in words none too tactful. Among other remarks calculated to arouse resentment in England, Monroe said that the Jay Treaty was "the most shameful transaction I have ever known of the kind." Although Monroe spoke thus openly, he seems to have done nothing to convince France that the Jay Treaty was not provocation for war against the United States. Relations between the United States on the one hand and France and Great Britain on the other were already strained, so that Washington finally recalled Monroe in 1796. Monroe's recall caused extreme party feeling for a brief time, and Monroe himself felt called on to publish an elaborate defense of his conduct and then retired to private life. Washington, it is known, never forgave Monroe for the latter's pamphlet, *View of the Conduct of the Executive.*

This retirement lasted only three years, for in 1799 he was elected governor of Virginia, a position he held until 1802. In the meantime Thomas Jefferson, Monroe's intimate friend, had become President, and in 1802 sent Monroe to France as a commissioner to assist Robert R. Livingston in negotiating for the purchase of the mouth of the Mississippi. The commissioners bought not only the land at the mouth of the Mississippi, but the entire Louisiana Territory (see LOUISIANA PURCHASE). Next Monroe served as minister to Great Britain and then as minister to Spain. The treaty which he finally negotiated with Great Britain was unsatisfactory to the President, because it did not include the abandonment of the British claim to a right to impress seamen. It was never offered to the Senate for approval. At Madrid Monroe tried in vain to arrange the transfer of Florida to the United States. Thus Monroe as a diplomat was not successful, if success means reaching the goal for which one starts. On the other hand, it is generally recognized that he faced tremendous handicaps and did the best he could.

As an Executive. On his return to the United States in 1807 Monroe felt it necessary, just as he had in 1796, to make public defense of his actions in Europe. The leaders of the nation were divided in their opinions, but the public was enthusiastic in its approval. He was again elected to the Virginia assembly, and in 1811 was again elected governor of Virginia. Before the end of the year, however, he resigned the governorship to become Secretary of State under President Madison. This office he held until his own elevation to the Presidency in 1817, and in 1814 and 1815 also acted temporarily as Secretary of War. During the War of 1812, therefore, he bore a double burden in a trying situation, but he performed invaluable service to the country and added greatly to his favor with the public. He was especially active in attempting to protect Washington, the capital, from an enemy attack. In 1816, while still Secretary of State, he was elected President of the United States, receiving 183 electoral votes to 34 for Rufus King, the Federalist candidate.

The Administrations of James Monroe, 1817-1825

Era of Good Feeling. The eight years of Monroe's Presidency are generally known as the "era of good feeling." The War of 1812 resulted in a stronger sense of nationality and confidence throughout the country than there had ever been before. From that time on the United States had less the character of a temporary experiment. The country had also won respect abroad, and was recognized in the family of nations as it had not been before. From



1789 to 1815 the European nations were absorbed in politics and war, and at the end of that time they turned to the West to find that a new nation had begun to grow in America. On land, to be sure, the Americans had suffered several severe defeats, but they had proved that on the sea they could sail and fight ships of war on an equal basis with the English. This fact alone helped to give Europe a new respect for the United States. In domestic affairs the United States was to reap the advantage of broken party lines. The Federalist party, largely because of its unpatriotic stand during the War of 1812, had lost almost all influence. There were really no political parties during Monroe's administration. There were sharp differences of opinion on many great problems, but there were no hard, set lines of division. There were, too, many smaller contests between men whose personal ambitions conflicted. These created as much bitterness in this "era of good feeling" as the differences of opinion on important public policies. An excellent example is Henry Clay's bitterness against Monroe after the latter had passed him by and made John Quincy Adams Secretary of State.

Westward Expansion. One of the first questions on which Clay and Monroe became opponents involved "internal improvements." In the closing months of the preceding administration Congress had voted a fund for such improvements, which Madison vetoed. Monroe, in his characteristically conscientious fashion, made an extended tour of the Northern and Western states two months after his inauguration. Instead of converting him, the trip seems to have removed none of his objections. In his first message to Congress he declared it to be his "settled conviction" that Congress did not possess the right of constructing roads and canals. The challenge thus offered was accepted by Clay, who maintained that the Constitution did give the Federal government the power to construct roads and canals, and even asserted that the consent of the states, which had been thought necessary before beginning the construction of the Cumberland Pike, was not required at all. He spoke, he said, as a Western man, as a representative of a new country and a pioneer population, needing means of communication, channels of commerce and intelligence as the breath of life. He spoke as a citizen of the Union, looking forward to a great

destiny. Was the Constitution made for the benefit of the Atlantic margin of the country only—for the few millions then inhabiting this country? "No," he exclaimed, "every man who looks at the Constitution in the spirit to entitle him to the character of a statesman, must elevate his views to the height which this nation is destined to reach in the rank of nations. We are not legislating for this moment only, or for the present generation, or for the present populated limits of the United States; but our acts must embrace a wider scope—reaching northwestward to the Pacific, and southwardly to the River Del Norte. Imagine this extent of territory covered with sixty, seventy, or an hundred millions of people!"

This was the vision of Henry Clay, and to a lesser degree became the vision of nearly every man and woman in the United States. During Monroe's Presidency it was still regarded by many as a dream, but Clay held to it. Five states were admitted to the Union—Mississippi in 1817, Illinois in 1818, Alabama in 1819, Maine in 1820, and Missouri in 1821—and Florida was purchased in 1819. These were visible signs of national expansion, and it was only a few years before the nation was convinced of the need for internal improvements.

War with the Seminoles and the Florida Purchase. During the War of 1812 United States troops had taken possession of West Florida, but East Florida remained in the hands of the Spaniards. The latter made no attempt to preserve order, and the territory was overrun with white adventurers, escaped negro slaves and Seminole Indians, the latter being a tribe of hostile Creeks. Not infrequently bands of Indians and negroes crossed the Georgia frontier on marauding expeditions, and then fled back into Spanish territory. The Georgians lived in constant danger and were also annoyed that their runaway slaves had such an easy refuge. At the end of the year 1817 war broke out between the whites and the Seminoles in Georgia. General Andrew Jackson was ordered to take command of the United States forces. Jackson advanced through Georgia with great haste, and by March, 1818, was on the Florida frontier.

Jackson's theory was that he was to follow the Indians until he caught them, wherever they might go. He therefore pursued the Indians into Florida, and after defeating them, turned and captured Pensacola, whose Spanish governor had been supplying the Indians with arms. In five months Jackson broke the power of the Indians, established peace on the border, and for all practical purposes had conquered Florida. In itself the campaign was insignificant. Jackson's army included 3,300 men of whom 1,500 were friendly Indians; not one white man was killed, and the Indians lost only twenty men. Yet in its results the Seminole War was one of the most important in American history. It nearly caused a war with Spain and with Great Britain, two of whose subjects Jackson had summarily and unjustly condemned to death. It did actually result in the negotiation, in 1819, of a treaty for the sale of Florida by Spain to the United States for the sum of $5,000,000. The treaty was formally ratified in 1821, and in March, 1822, Florida was organized as a territory of the United States.

The Missouri Compromise. Early in 1818 Missouri, which had been a territory since 1812, applied for statehood. The House of Representatives agreed to the admission of Missouri on condition that slavery be prohibited. This provision was defeated in the Senate, and thus for the first time brought slavery prominently before the public as a national political issue. The slave and the free states were henceforth anxious to maintain the balance between the two sections. Whenever a territory applied for admission as a state, it was always necessary to consider the question of balance between those states in which slavery was permitted and those in which it was forbidden. Largely through the efforts of Henry Clay an arrangement known as the Missouri Compromise (which see) was agreed on in 1820. President Monroe approved the bill for the admission of Maine on March 3, 1820, and for Missouri three days later, but the admission of Missouri was delayed for a year, until the Missouri legislature agreed not to exclude free negroes from the state.

The Monroe Doctrine. In his annual message to Congress in 1822, President Monroe recommended the recognition of the independence of the South American republics. Congress promptly responded. In December, 1823, Monroe made certain references to American foreign policy; these form the basis of the famous Monroe Doctrine. This historic document is discussed at length under its title.

The American System. In spite of President Monroe's opposition the vogue of internal improvements steadily increased. In fact, internal improvements became a part of what Henry Clay named the "American system." In 1821 the Republicans in Congress defeated a bill providing for the beginning of a national

OUTLINE AND QUESTIONS ON JAMES MONROE

Outline

I. Youth and Preparation

(1) Birth
(2) Ancestry
(3) Education

II. Military Experience

(1) First campaign
(2) On Lord Sterling's staff
(3) In Virginia

III. Public Career

(1) In Virginia assembly
(2) In Congress
(3) In Virginia convention of 1788
(4) As United States Senator
(5) Minister to France
(6) Governor of Virginia
(7) Further diplomatic missions
(8) Again governor of Virginia
(9) Secretary of State

IV. His Administrations

(1) "Era of good feeling"
  (a) Its causes
  (b) Its effects
(2) National expansion
  (a) Internal improvements
  (b) Five new states
(3) War with Seminole Indians
  (a) Causes
  (b) Significance
  (c) Purchase of Florida, 1819
(4) Crisis of 1819
(5) Missouri Compromise
  (a) Necessity for compromise
  (b) Details of arrangement
(6) Election of 1820
(7) Monroe Doctrine
(8) The "American System"
  (a) To build home markets
  (b) To strengthen home industries
(9) Lafayette's visit to America
(10) First steamer crossed Atlantic

Questions

Which of the following men belonged to Monroe's party: Madison, Jefferson, Jay, Washington, Marshall, John Randolph, Patrick Henry?

In what battles of the Revolutionary War did Monroe take part?

What was his part in the War of 1812?

Why was Monroe's expedition into Virginia in 1778 of importance?

How did Washington "maintain the balance" when he sent Monroe as minister to France?

What did Monroe call "the most shameful transaction I have ever known of the kind?"

In what sense was he not successful as a diplomat?

What was the "vision of Henry Clay?" How far has it become an actuality since his day?

How did it happen that there were no political parties during this administration?

How was the great popularity of the President shown in the election of 1820?

What is the combined area of the states admitted during this administration?

In what sense can it be said that a war in which not a white man was killed was one of the most important in the history of the country?

Of what document was the statement that America is not to be considered a "subject for future colonization by an European power" a part? What are the essential features of the declaration?

What part did Monroe assume in the affairs of his country before his election to the Presidency?

In what year did the first steamship cross the Atlantic Ocean?

canal system, but in the next year only the President's veto prevented the appropriation of funds for the Cumberland Road. In 1824 the supporters of the American system were in the majority in both Houses, and Monroe finally signed a bill providing for surveys of national canals. The other essential of Clay's system was a protective tariff, the argument being that protection was necessary to build up home industries and to provide a home market for their products. Politics played some part in the passage of a protective tariff act in 1824, but party lines, so far as any existed, were disregarded. It was the year of a Presidential election, but the four leading candidates—Clay, Adams, Crawford and Jackson —were all open advocates of protection. The tariff of 1824 was approved by the Central and Western states, for it increased the duties on iron, lead, wool and other articles for which they desired protection. But it was strongly opposed by the South and by all the New England states except Rhode Island and Connecticut.

It is worthy of note that the demand for protection was preceded, then as many times since, by a financial crisis and industrial depression. During the War of 1812 business was stimulated and prices were high. The tariff of 1816 was passed to ward off the flood of cheap English goods which began to pour in as soon as peace was declared, but it failed to achieve its object. The expenditures of the government decreased, there was less demand for foodstuffs, and there was an unusual demand for precious metal in Europe, with the result that it became difficult for banks in the United States to resume specie payments. Money became "tight," and in 1819 came a crisis. Prices began to fall, many businesses failed, and more careful living was necessary. Hard times was followed by a cry for relief, and relief was expected through protection.

Elections of 1820 and 1824. In 1820 Monroe was reëlected President without opposition. He received all the electoral votes but one, which was given to John Quincy Adams. The election of 1824 was of a totally different character. The "era of good feeling" had left the country without political parties, and the personal question became the most important one. At first there were six candidates, Jackson, Adams, Clay, Crawford, Calhoun and Clinton of New York. Calhoun and Clinton soon withdrew, and the former was later elected Vice-President. As all the candidates belonged to the same party, the stump speakers and newspapers talked about personalities. Adams wrote in August that "the bitterness and violence of Presidential electioneering increase as the time advances. It seems as if every liar and calumniator in the country was at work day and night to destroy my character." Crawford was called corrupt; Jackson was denounced as a murderer; and Clay was labeled the gambler. When the result of the election was known it turned out that Jackson had received ninety-nine electoral votes; Adams, eighty-four; Crawford, forty-one; and Clay, thirty-seven. This result threw the election into the House of Representatives.

According to the Constitution the House of Representatives was limited to a choice between Jackson, Crawford and Adams. Clay was deeply disappointed, the more so because the five votes of Louisiana were said to have been lost to him by trickery. Instead of being made President, he now found himself able to make a President, for his influence in the House of Representatives commanded sufficient votes to decide the election. The story of this episode has been told again and again. Clay was urged to give his support to Jackson, then to Crawford, and finally to Adams. But weeks before the election in the House, Clay's mind was made up, and in a letter to a friend he stated that he would lend his influence to Adams, because he could not vote for Crawford, who was a helpless paralytic, and because he did not think that a military hero was a fit man for the Presidency. Even before the vote was taken Jackson's managers attempted to prove that a "corrupt bargain" existed between Clay and Adams, but no evidence to support this charge was ever found. On February 9, 1825, the House elected Adams.

Monroe's Last Years. Thus Monroe's successor was chosen less than a month before the end of the latter's term. Monroe retired to private life, spending part of his time on his Virginia estate and part in New York City. With his two predecessors as President, Jefferson and Madison, he served in 1826 as a regent of the University of Virginia, and in 1829 was a member of the Virginia constitutional convention. He died at New York on July 4, 1831, five years after the deaths of John Adams and Thomas Jefferson. His remains rest at Hollywood, Richmond, Va. W.F.Z.

Consult Gilman's *James Monroe, in His Relation to the Public Service;* also his *James Monroe,* in American Statesmen Series.

MONROE, La., the parish seat of Ouachita Parish, is situated on the east bank of the Washita River, in the north-central part of the state. Baton Rouge, the state capital, is 155 miles southeast, Shreveport is ninety-seven miles west, and Vicksburg, Miss., is seventy-six miles east. Monroe is served by the Arkansas, Louisiana & Gulf, the Vicksburg, Shreveport & Pacific and the Saint Louis, Iron Mountain & Southern railroads, and by steamboats which ply the river from New Orleans to Camden, Ark. The area of the city is nearly five square miles. The population, which in 1910 was 10,209, was 13,214 in 1916 (Federal estimate).

Monroe is situated in one of the best agricultural sections of the South and has a large trade in cotton and lumber. The principal industries are machine shops, cotton compresses, cottonseed oil mills and manufactories of automobile and wagon materials and other lumber products. The city has a Federal building, courthouse, city hall, public library, market house, salt-water natatorium, Saint Francis Sanatarium and a city park of fifty acres.

A settlement on the site of Monroe was made in 1785 while Louisiana belonged to the Spanish. In 1819 the place was renamed Monroe, in honor of James Monroe, then President. It was incorporated in 1820 and received city charters in 1871 and in 1902.

MONROE DOCTRINE, the name applied to the policy of the United States toward preserving the independence and safety of the Latin American states. The Doctrine was first clearly stated by President Monroe in a message of 1823, though the main ideas of that message, and some of the wording, are due to John Quincy Adams, then Secretary of State. The reason for the pronouncement of the Doctrine was that by the American Revolution, and then by the revolt of the Latin American colonies, a new kind of state was created in the world. Up to 1775, every civilized person in North and South America was the subject of some European power. It was a new thought that American colonies could establish themselves as independent and sovereign nations. The ideas of the Monroe Doctrine are as follows:

(1) **Two Spheres.** It was held that the world was divided into "two spheres," the Eastern hemisphere and the Western. President Washington stated one side of that principle in his doctrine of "Isolation," which was that the United States was not called upon to take part in the affairs, and especially in the wars, of Europe. The other side, as worked out by Adams and Monroe, was that European powers ought not to interfere in the affairs of Americans. They recognized that Great Britain had large interests in Canada and the West Indies, and that France and some smaller European nations had small interests in the West India Islands and the coast of South America. As Monroe put it in his message, "With the existing colonies or dependencies of any European power we have not interfered and shall not interfere." He goes on to say: "But with the governments who have declared their independence and maintained it, and whose independence we have . . . acknowledged, we could not view any interposition for the purpose of oppressing them or controlling in any other manner their destiny by any European power in any other light than as the manifestation of an unfriendly disposition towards the United States."

(2) **Political System.** Monroe wrote, "The political system of the allied powers is essentially different . . . from that of America. We owe it, therefore, to candor, and to the amicable relations existing between the United States and those powers, to declare that we should consider any attempt on their part to extend their system to any portion of the hemisphere as dangerous to our peace and safety." By "political system," Monroe meant the combination of European powers commonly called the Holy Alliance (which see), which was threatening to invade Latin America in order to restore the new states to the rule of Spain and Portugal.

(3) **Colonization.** In his message Monroe said, "The American continents, by the free and independent condition which they have assumed and maintain, are henceforth not to be considered as subjects for future colonization by any European powers." This was directed against Russia, which laid claims to the Pacific coast of America as far south as the fifty-first parallel.

(4) **Peace.** The purpose of Monroe and Adams was to prevent wars of conquest in America and especially to avoid wars which might spring up between the United States and new European neighbors.

(5) **Enlargements.** The message of 1823, with its strong statement of the position of the United States, broke up all the plans for invasion; and only once since has a European power attempted to plant a colony in defiance of the Monroe Doctrine. This was the French

occupation of Mexico (1861-1867). Secretary Seward did not at that time use the expression "Monroe Doctrine" in his dispatches, but he gave the French plainly to understand that they must leave Mexico or the United States would compel them to go.

The original Monroe Doctrine has been much altered and enlarged by public statements made by Presidents and Secretaries of State, especially President Polk in 1845; by President Grant in 1869; by Secretary Evarts in 1880, who used the new phrase "the paramount interest of the United States." President Cleveland, in 1895, took the extreme position that the Monroe Doctrine was international law binding on Great Britain, and that it was violated when Great Britain refused to arbitrate the boundary question with Venezuela. Secretary Olney went further by the statement that "to-day the United States is practically sovereign on this continent and its fiat is law upon the subjects to which it confines its interposition."

The delegates of the United States to the Hague Conferences expressly reserved from the operations of the Hague Conventions our "traditional attitude toward purely American questions." President Roosevelt extended the doctrine to cover the case of a European power which might attempt to seize or occupy the territory of an American state in order to secure payment of claims. At the same time he announced that the United States would itself deal with American neighbors which refused to make proper amends to European powers. This is the so-called policy of "the Big Stick."

The Monroe Doctrine has never been expressed in a treaty or an act of Congress, and it has undergone many changes in the course of a century. Nevertheless its underlying principle is that European powers shall not come in and alter the map of America, which would be to the disadvantage of the United States; and that principle is firmly held by the American people. A.B.H.

Consult Taft's *The United States and Peace;* Bigelow's *American Policy;* Kasson's *Evolution and History of the Monroe Doctrine.*

MONROVIA, *mon ro' vi a,* the capital of the negro republic of Liberia, in West Africa, situated on the Atlantic coast at the mouth of the Saint Paul River. It is a port of entry, visited regularly by seven lines of steamers, from Great Britain, Germany and Spain. The principal exports are rubber, coffee, palm nuts, palm oil and dyewoods. Monrovia is the seat of Liberia College, was founded in 1824 and named for President James Monroe. See LIBERIA. Population, about 6,000.

MONSOON, *mon soon',* the seasonal wind on the Indian Ocean which blows in an almost steady gale from the southwest from April to October. Although this part of the world lies where the trade winds blow from the northeast during the other half of the year, the heat equator moves so far north during the summer that the direction of the wind is forced to change, for cool air, which is heavy, naturally rushes in where the light, warm air is rising. These summer winds generally are accompanied by rain in portions of India and the East Indies, so sailors have called them the *wet monsoons,* while the trade winds are often termed the *dry monsoons* in this section. When the rain fails to accompany the southwest monsoon, as it did in the years 1895, 1896 and 1899, terrible famines occur in India and the East Indies, causing a great loss of life. See map, WIND.

MONTAIGNE, *mon tane',* MICHEL EYQUEM DE (1533-1592), a French writer who has the honor of having initiated the essay form of literature. He was born at the Castle of Montaigne in Périgord, and until the age of six was taught to speak nothing but Latin. After that time he became a pupil at the Collège de Guyenne at Bordeaux, and when thirteen began the study of law. Little is known of his youth and early manhood, but from 1554 until 1567 he was a parliamentary counselor. His first literary work was the translation of the *Natural Theology* of Raimond Sebond. In 1571 he succeeded to his father's estates, and in 1580 traveled extensively in Switzerland, Italy and Germany for health, instruction and pleasure.

During this life of leisure he began to write the essays for which he is famous, doing this, as he said, because he felt the need of occupation. These essays, which have held the attention of readers for over 300 years, were inspired by the caprice of the moment and touched upon all kinds of subjects, even upon the tastes, habits and thoughts of his own daily life, and have exercised a lasting influence on the world's thought and writing. His *Voyages,* a diary of his travels, was first published in 1774. The translations of Montaigne's essays by Florio, revised by Hazlitt in 1893, are still the standard English version. It was Florio's version with which Shakespeare was familiar, and this same translation had an influence on the writing of Bacon, the greatest English essayist. See ESSAY.

THE STORY OF MONTANA

MONTANA, *mon tah' na*, a northwestern state of the American Union, popularly named THE TREASURE STATE because of its great wealth in copper, silver, gold and coal, its large production of wool, and its beautiful natural scenery. The name is derived from the Spanish word *montana*, which means *mountainous*, and clearly indicates the physical character of the state. One of the great beauty spots in the United States, the Glacier National Park, is within its borders, while one entrance to the Yellowstone National Park is also in this state. As its flower, Montana has chosen the bitterroot.

Size and Location. Among the states of the Union only Texas and California are larger than Montana, which has an area of 146,997 square miles. It is therefore about three times the size of New York, and is equal in extent to the combined areas of the United Kingdom, the Netherlands and Belgium. Its greatest length from east to west is 540 miles, as far as from Duluth to Saint Louis, and its average width from north to south is 275 miles.

Its People. With 376,053 inhabitants in 1910, Montana ranks fortieth among the states. It contains about the same number of inhabitants as the province of Alberta, one of its neighbors across the international boundary; the latter is, however, of much larger size, having 100,000 square miles more territory. The most thickly-settled regions are the western mining districts. The average density of population for the state in 1910 was 2.6 persons to the square mile. On January 1, 1917, the Federal Census Bureau estimated the population at 466,214. A characteristic feature of its population is the great preponderance of males, who numbered 226,872 in 1910, as against 149,181 females. This means that there were 152 men to every 100 women. Of the population in 1910, 43.1 per cent were native whites of native parentage; 28.4 per cent were native whites of foreign or mixed parentage; 24.4 per cent were foreign-born whites. Of the foreign-born population 14.7 per cent came from Canada; 10.3 per cent from Ireland; 9.8 per cent from England, and about the same proportion from Germany, Austria, Norway, Sweden and Italy, respectively.

Nearly two-thirds of the people live under rural conditions. The principal cities are Helena, the capital; Butte, the most populous city; Great Falls, Billings, Bozeman, Anaconda, Miles City and Missoula.

Indians. In 1910 the Indians numbered 10,745, and formed 2.9 per cent of the total population. They belonged chiefly to the Assiniboin, Blackfeet, Chippewa, Gros Ventres, Pend d'Oreille and Sioux tribes. All of them live now on government reservations in various parts of the state; these contain 4,312,452 acres of agricultural and grazing lands.

Education. Considering its scattered population, educational conditions in Montana are excellent. The permanent school fund consists of public school lands of great extent, and this source of income is supplemented by state and local taxation. The state has a good compulsory education law; the schools are under the supervision of a state board of education and of a state superintendent of public instruction, elected by the people for four years. Each county has its own superintendent, elected for two years. The percentage of those unable to read or write was 4.7 in 1910.

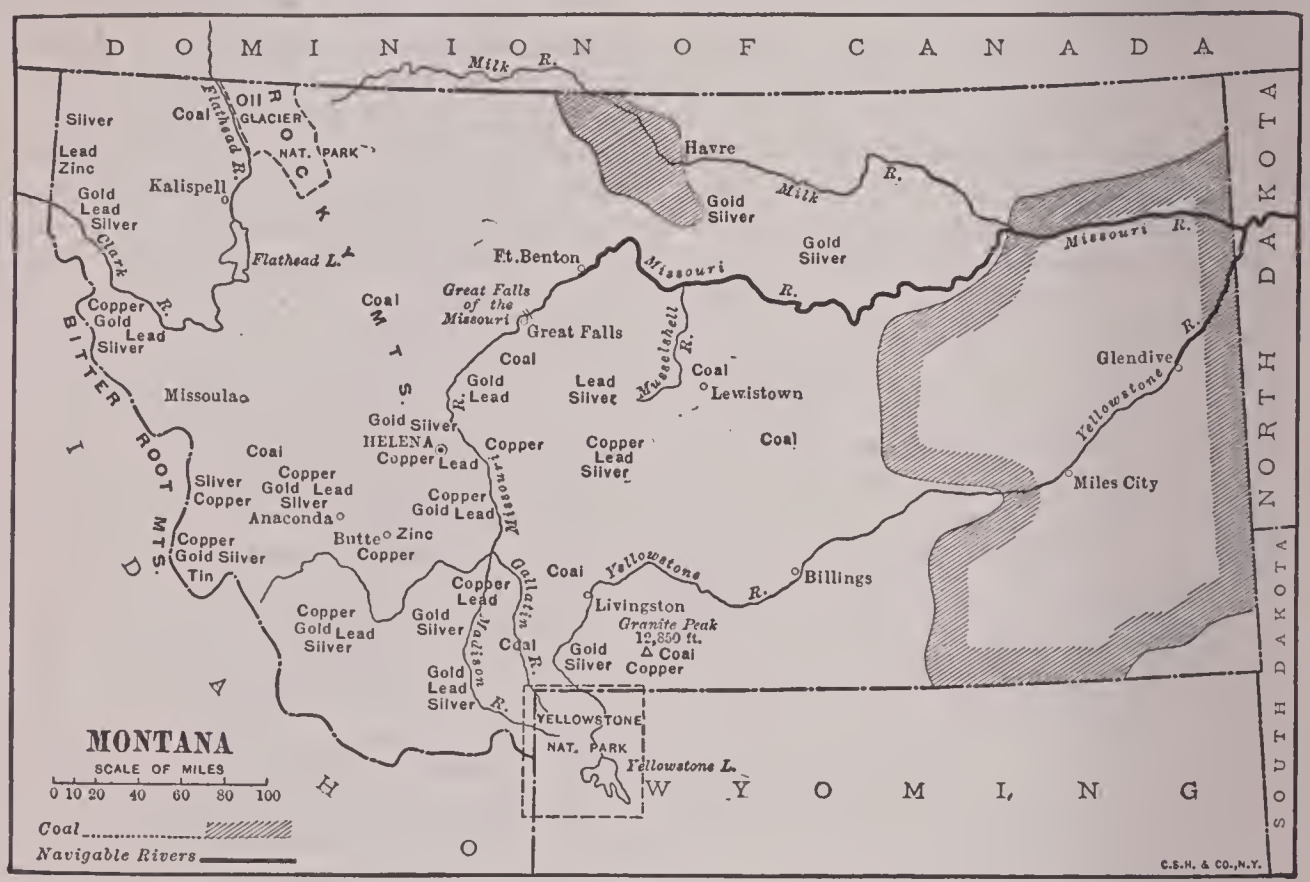
At the head of the educational institutions stand the University of Montana at Missoula, opened in 1895; the College of Agriculture and Mechanical Arts at Bozeman, opened in 1893; the School of Mines at Butte, opened in 1900, and the State Normal College at Dillon. These four state institutions are administered under one head, the Chancellor of the University of Montana. Other educational institutions are the Montana Wesleyan University at Helena, and the College of Montana at Deer Lodge, maintained by the Presbyterians. A number of experimental substations in agriculture and horticulture are maintained, and the United States Department of Agriculture established

in 1911 an experimental farm on the Huntley reclamation project.

Religion. The Roman Catholic Church is the strongest, possessing more than sixty per cent of the total Church membership of the state. Of the Protestant churches the Methodists, the Presbyterians and the Episcopalians, in the order named, are the most numerous.

Physical Features. The eastern three-fifths of the state belong to the great central plain, and the surface consists almost entirely of rolling prairie, which rises gradually to meet the foothills of the Rocky Mountains to the west. No portion of Montana lies at a lower altitude than 1,000 feet above sea level, while over one-half of the state has an altitude varying between 1,500 and 3,000 feet. In the prairie region there are isolated *buttes,* or hills, and bluffs occur along the streams. Some of these elevations have been sculptured in a wonderful manner by the winds, and are interesting objects (see EROSION). The main range of the Rocky Mountains extends from the Yellowstone Park across the state in a northwesterly direction. About 100 miles west of the main range is found the Bitter Root range, which forms over half of the western boundary of the state. Between these two mountain ranges lies a broad basin, whose surface is greatly diversified by numerous spurs and cross ranges. This region is remarkable for the beauty and grandeur of its scenery.

The mountainous portion of Montana contains many lofty peaks, the most noted being Granite Peak, 12,850 feet high; Mount Douglas, 11,300 feet; Mount Powell, 12,000 feet, and Gallatin Peak, 10,967 feet. In the northern mountainous district of this state is situated the Glacier National Park.



OUTLINE MAP OF MONTANA

Showing the boundaries, principal rivers, largest cities, coal measures, mineral deposits, and the highest point of land in the state.

Rivers. The main range of the Rocky Mountains constitutes the Continental Divide, which separates the basin of the Missouri from that of the Columbia. The portion of the state west of the Rocky Mountains is drained by the Clark River and its tributaries into the Columbia; the region east is drained by the Missouri, which rises in this state. The Yellowstone and the Musselshell, both tributaries of the Missouri, are the other principal rivers in Montana.

In its waters Montana possesses a great source of potential wealth, for there are several waterfalls that are among the highest in the world. These are the Upper Yellowstone (310 feet high); the Lower Yellowstone (110 feet); and the Missouri (90 feet). The Missouri is

navigable to Fort Benton, not far below the Great Falls, and the Yellowstone is also navigable for small boats for about 300 miles. The only lake of importance is the Flathead, situated in the northwestern part of the state.

Climate. Like most inland regions, Montana possesses what is known as a continental climate, and experiences a wide range of temperature. Thus in winter the thermometer sometimes falls as low as 40° below zero, while in summer it rises to over 100° above. But on account of its altitude and the dryness of the air the heat in summer is not oppressive, while the *chinook* winds, which bring warm and dry air when they arrive in Montana, make the winters much milder. The mean annual temperature for the state is about 11° F. for the coldest, and 70° F. for the warmest, month. The rainfall averages about fifteen inches in the eastern regions to about twenty inches in the west, while the northwestern corner has a still greater rainfall.

Resources and Industries

Forests. Imagine for one moment the whole state of Pennsylvania to be one continuous forest and you will gain an idea of the extent of territory the forests of Montana occupy. They cover about 42,000 square miles, which represents nearly one-third of the area of this large state. The chief trees are yellow pine, white pine, red fir, white fir, hemlock and larch. The yellow pine often attains a hundred feet in height and five to seven feet in diameter, and is the most useful timber tree in the state.

Agriculture. The vast rolling prairies, the extensive alluvial bottom lands, and a great number of the valleys, offer a large field for agricultural pursuits. It is therefore little to be wondered at that agriculture is making great strides, especially in the regions where irrigation works have been constructed. Of the total land surface, amounting to 93,568,000 acres, about 15 per cent is occupied by farms.

When the agricultural census was taken in 1910 hay was by far the most important crop in Montana. The area under hay cultivation was twice as great as that under all cereals, and its value was also greater than that of all the cereals combined. Since that time the growing of wheat has assumed such proportions that it has surpassed hay in value as well as in acreage, while oats hold a position nearly as important. In 1915, a year of great crops throughout North America, Montana raised more than 33,000,000 bushels of wheat and 31,000,000 bushels of oats, and its hay crop was over 1,500,000 tons. Other important crops are flaxseed, potatoes, corn and sugar beets. The eastern part of the state is devoted principally to dry farming and grazing. In the mountain valleys are found large orchards, as these regions are remarkably well suited to the growing of apples and other orchard fruits.

Over ninety per cent of the farms of Montana are operated by owners or their managers, and less than ten per cent by tenants. The great majority of the farms have been acquired by their owners from the government or from private corporations in the form of homesteads (see HOMESTEAD LAWS), and by entries on irrigated lands. Most of these have been obtained at a small price, or on long time credit, and this has made it possible for farmers of small means to become owners.

Irrigation. Montana ranks third among the states of the Union as regards the area of its irrigated lands, coming after Colorado and California. About one-third of its total farm acreage is irrigated. Irrigation is resorted to throughout the state, but seventy-five per cent of the irrigated land is situated in the western mountainous section. Montana had 1,679,084 acres of irrigated land in 1910 and projected works will irrigate nearly 1,000,000 acres more before 1920. The most important of these are the Huntley, the Milk River and the Sun River projects, for irrigating 32,688 acres, 219,557 acres and 174,046 acres, respectively. The Lower Yellowstone project for irrigating 60,000 acres in Montana and North Dakota, completed in 1915, is also worthy of mention, also the Flathead project, 152,000 acres; Fort Peck project, 152,000 acres, and Blackfeet project, 122,500 acres, all three of which are for the benefit of the Indians.

Live Stock. A striking characteristic of Montana is the great area of semiarid land utilized for grazing purposes. Many large farms, or ranches, frequently exceeding 100,000 acres in extent, are located in the state. Not many regions in the United States offer greater advantage to the stock raiser. The bunch grass and buffalo grass found on Montana plains are remarkably nutritious and well suited for fattening stock.

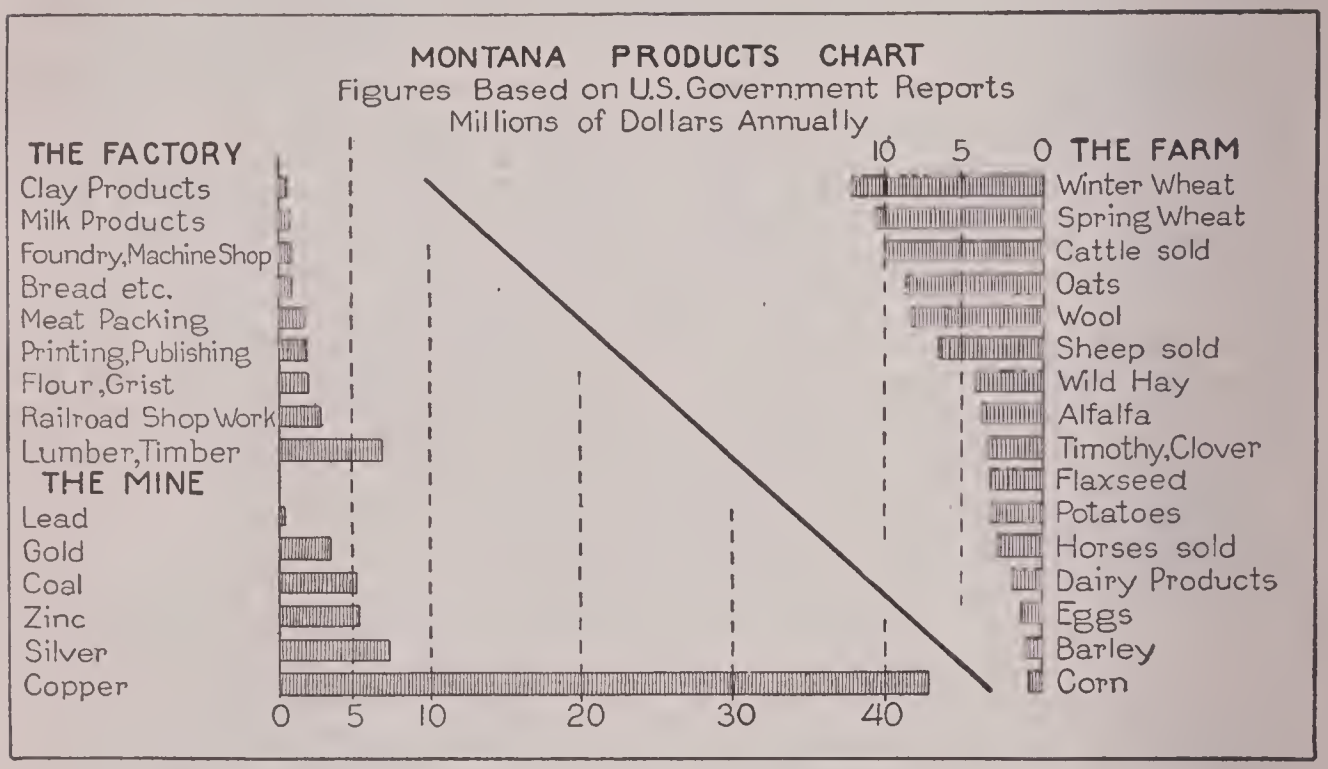
For a number of years Montana has been the leading state in the Union in the quantity and

value of its wool production, but is now about equaled by Wyoming. The wool clip amounts each year to about 30,000,000 pounds of raw wool, or 11,000,000 pounds of scoured wool. The number of Montana's sheep, nearly 5,000,000 in 1909, decreased to about 4,000,000 in 1916, and was exceeded in Wyoming and nearly equaled in New Mexico. The breeding of horses has become an important industry. Miles City, where the United States army has one of its remount stations, is now one of the greatest horse markets in the nation.

Mining. Montana is one of the richest states in mineral wealth, and mining has been its leading industry ever since gold was discovered in this region in 1861. But the state has become most famous for its copper mines. Around Butte is found one of the richest copper mining regions in the world. Montana was for many years the leading state in the production of copper, but since 1906 its output has been surpassed by Arizona. It has contributed more than six and a half billions of pounds of copper, which represents about one-third of the total output of copper in the United States since 1845. Nearly 300,000,000 pounds are mined annually.

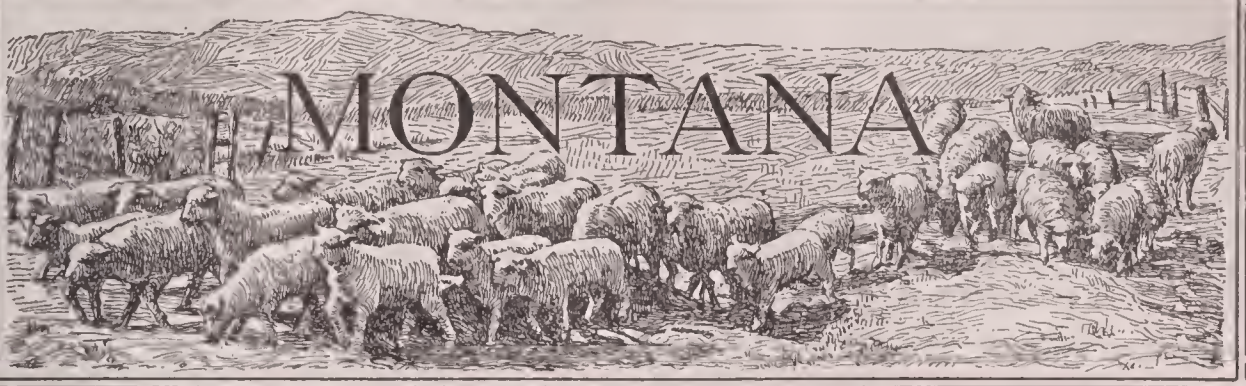
Next in importance is silver, which is obtained chiefly as a by-product in the smelting of copper. With a production of 12,000,000 ounces, valued at about $7,000,000, each year, Montana usually takes second rank, surpassed only by Nevada. Gold (200,000 ounces produced in a year) and zinc are other leading minerals. Coal is being mined in larger quantities every year, the bituminous yield being nearly 3,000,000 tons. According to a report of the United States Geological Survey, the Fort Union coal region in eastern Montana is one of the largest fuel-bearing areas in the world; it is estimated that this region contains forty-five billions of tons of coal. The whole state is believed to contain nearly four hundred billions of tons.

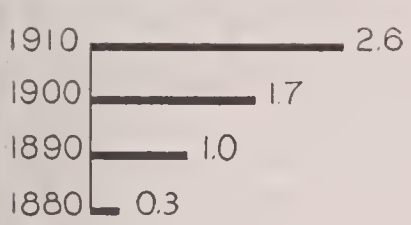
Montana is the leading state in the Union in the production of precious stones. This is due to the mining of sapphires, one of the few gems thus far found in the United States. Most of the gems, of an average yearly value of $250,000, are sent to Switzerland, where they are used as jewels in the manufacture of watches. The total value of the mineral products has in some years been over $70,000,000.



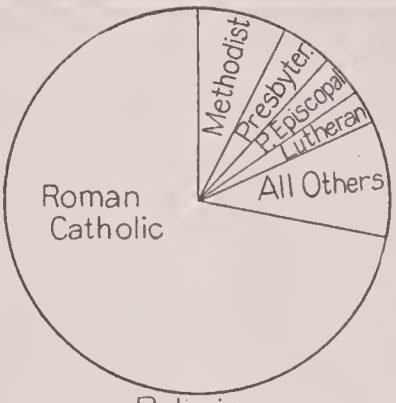
Manufactures. As it is to be expected under conditions which are described above, the smelting and refining of copper is by far the most important manufacturing industry, and great smelter mills are located at Anaconda, Great Falls, Butte and East Helena. Next in importance is the manufacture of lumber and timber products. Over one hundred great sawmills are engaged in this industry, the largest ones being established at Hamilton and Bonner. Most of the timber milled is yellow pine and larch, Montana taking first rank in the production of the latter. The beet-sugar indus-

MONTANA



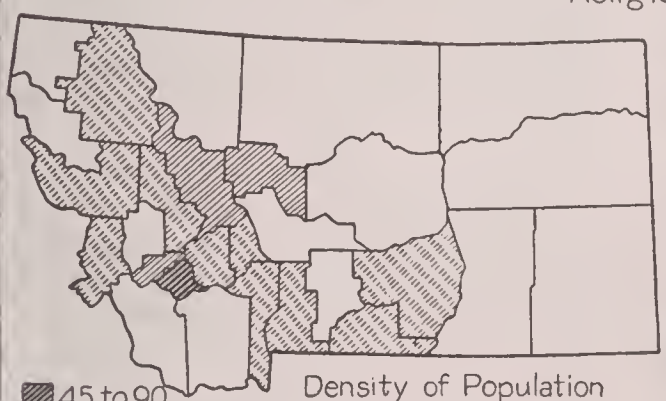


People per Square Mile
by Decades



Religions

Location of
Glacier National Park



Density of Population
per Square Mile

A Typical Copper Mine

Grinnell Mountain and Lake McDermott,
Glacier National Park

try is developing rapidly, and a large sugar factory is established at Billings.

Transportation. Three great trunk lines cross Montana from east to west; these are the Great Northern in the north, the Chicago, Milwaukee & Puget Sound in the center, and the Northern Pacific in the center and south. The Oregon Short Line enters from Idaho and extends to Butte; the Chicago, Burlington & Quincy enters from Wyoming and runs to Billings and Great Falls. Each of these lines has a number of branch lines, or feeders. At the end of 1914 the state had 4,846 miles of railroad. Although the railway mileage is increasing each year, there are still large areas where stages are the only means of conveyance. In the mountain regions saddle horses and pack mules are largely used.

Government and History

State Constitution. Montana is governed under the constitution adopted in 1889, the year the state was admitted to the Union. In 1906 an amendment was adopted which provided for the initiative and referendum. In 1914 another amendment granted the franchise to women on the same terms as to men. This victory for women was due in large measure to the untiring efforts of Miss Jeannette Rankin. The people of the state rewarded her with election, in November, 1916, to the national House of Representatives—the first woman who was ever accorded that honor. She took her seat at the special war session of Congress, in April, 1917 (see RANKIN, JEANNETTE).

Other Constitutional Provisions. A period of eight hours constitutes a legal day's work in all undertakings carried on by the state, counties or towns, and on all contracts given out by them, as well as in mines, mills and smelters for the treatment of ores. It is not legal to employ children under sixteen years of age in underground mines. The granting of injunctions in suits arising from labor disputes is prohibited.

The executive officers—governor, lieutenant-governor, secretary of state, attorney-general, treasurer, auditor and superintendent of public instruction—are elected for four years. All of them are eligible to reëlection except the treasurer. The governor, lieutenant-governor and superintendent of public instruction must be at least thirty years of age at the time of their election. The governor cannot veto any measure referred to the people by the legislative assembly or by initiative and referendum petitions. The governor's veto of any bill can be overridden by a two-thirds vote of both houses of the legislature. Among the special offices created recently are that of state fire marshal and state sealer of weights and measures.

The legislative authority consists of a senate and a house of representatives. Representatives are elected for two years; senators, one from each county, for four years, but half of the senate is renewed every two years. In 1915 the house of representatives consisted of ninety-three members, and the senate of thirty-nine members. The sessions of the legislature are held every two years, beginning on the first Monday in January in odd numbered years, and are limited to sixty days. Montana sends two members to the United States House of Representatives.

At the head of the judicial department is the supreme court, composed of three judges, each elected for six years. Below this are the district courts, each having one or two judges elected for four years. Justices of the peace are elected for two years.

For purposes of local government the state is divided into counties, but the most important government units are the cities and towns. A charter of incorporation may be granted to any town having 2,000 inhabitants, and such towns are given the right to adopt the commission form of government. A primary law provides for party nominations by direct vote for all national, state, county and municipal offices.

Charitable and Penal Institutions. The state maintains a soldiers' home at Columbia Falls; a home for orphans, foundlings and destitute children at Twin Bridges, and a school for deaf, blind and feeble-minded at Boulder. The insane asylum is at Warm Springs, and the state also maintains a sanitarium for persons suffering from tuberculosis. The state prison is at Deer Lodge, and at Miles City there is a reformatory school which provides manual and industrial training for young offenders between the ages of eight and eighteen years. The penal and charitable institutions are under the supervision of a state board of charities and reform, which consists of three members appointed for six years.

History. The present state of Montana was part of the territory that the United States

RESEARCH QUESTIONS ON MONTANA

(An Outline suitable for Montana will be found with the article "State.")

What special effort does the state make to provide against danger from fire?

What per cent of the total acreage is in farm lands?

If this farm land made up one continuous region, what state of the Union would it most nearly resemble in size?

What "by-product" has a value of over $6,000,000 annually?

According to present estimates, how long would the coal of Montana last if fifteen million tons were mined each year?

What famous general was killed by the Indians within the borders of this state?

What is the source of the school funds of the state?

What state is about the size of Montana's forested region? What tree is the most useful commercially?

What change has taken place in the relative importance of mineral products since 1861?

How many states surpass Montana in the production of its most valuable mineral output?

When did this territory come into the possession of the United States? To what country had it previously belonged?

How many people out of every hundred are Indians? How much land, on the average, does each Indian have allotted to him in the reservations?

Why is the summer temperature more endurable in this state than in many of the states farther east?

What is the *chinook?* What effect does it have?

How many sheep are there in the state? How much wool, on the average, is clipped from one sheep in a year?

How old must a boy be in this state before he can work in a mine?

How large a proportion of the people live in cities or towns?

How does Montana's loftiest waterfall compare in height with the falls of Niagara?

For whom is the largest lake in the state obviously named?

What use is made of much of the land which is too dry for the production of crops but is not desert?

How many constitutions has Montana had since it became a state?

How many states have a larger population? How many of these more populous states are larger?

If Montana and the smallest state in the Union could exchange populations, how much greater would the population density of the former be than it is at present?

What part has this state in the formation of the longest river in the world?

How does some of the drainage of the state reach the Pacific?

How much smaller would the farm area be if there were no irrigation?

Of what do the transportation facilities in the mountain regions largely consist?

What is the railroad mileage to each hundred square miles of area?

What three important countries of Europe have a combined area about equal to that of Montana?

How have more than half of the farms of this region been acquired by their owners?

What does the name *Montana* mean? Explain the popular name.

bought from France in 1803 by the Louisiana Purchase. The famous expedition of Lewis and Clark to the Pacific coast crossed this region in 1804 and 1805. The first permanent settlement was established at Fort Benton in 1846 by the American Fur Company. The real beginning of development was in 1861, when gold was discovered in the mountains. People flocked to these regions, and mining settlements rapidly appeared. In 1863 gold was discovered at Fairweather Gulch, near Alder Creek, and within a year the town of Virginia City, which was established near that spot, numbered 4,000 inhabitants.

Montana at first had been included in the Territory of Idaho, formed in 1863; in 1864 it was established as a separate territory. In 1874 the capital was removed from Virginia City to Helena. In 1876 occurred the disastrous fight on the Little Big Horn River between General Custer and the Sioux Indians under Sitting Bull. The rich copper mines around Butte were soon discovered, and from 1880 the mining of copper and silver became very important; in fact, for a long time afterwards the whole political and economic development of Montana was influenced by its copper mines.

In 1883 the Northern Pacific Railway was completed, and the development of the territory advanced very rapidly.

Admission as a State. In 1884 a constitutional convention framed a constitution that was ratified by the people, and application was made to Congress for its admission as a state. It was not until 1889, however, that Congress passed the enabling act for its admission, and on November 8, 1889, Montana became the forty-first state of the Union. From that time the state has advanced rapidly, both economically and politically. Labor troubles have been frequent since 1907, when a strike of long duration took place in Butte and in other cities. The Socialists have gained many adherents, and in 1911 they succeeded in electing their candidate as mayor in Butte. The people in 1916 voted for statewide prohibition, to go into effect January 1, 1919.

In national politics Montana was Republican in 1892; Democratic and Populist in 1896 and 1900; Republican again in 1904 and 1908. Woodrow Wilson carried the state for the Democrats by a small majority in 1912, and by 34,000 plurality in 1916. J.D.D.

Consult *Montana*, issued by the state department of agriculture; Linderman's *Calendar of Historic Events in the History of Montana.*

Related Subjects. The following articles in these volumes contain much information that will be of interest in connection with a study of Montana:

CITIES

Anaconda	Great Falls
Billings	Helena
Bozeman	Missoula
Butte	

LEADING PRODUCTS

Apple	Oats
Copper	Sapphire
Gold	Sheep
Hay	Silver
Horse	Wheat
Lumber	Wool

PHYSICAL FEATURES

Butte	Rocky Mountains
Missouri River	Yellowstone River

RESERVATIONS

Glacier National Park	Yellowstone National Park

UNCLASSIFIED

Dry Farming	Lewis and Clark Expedition
Irrigation	

MONTANA, UNIVERSITY OF, a coeducational institution, organized at Missoula in 1895. Three years previous to its opening Congress endowed the university with a public-land grant of seventy-two sections. The annual income from land unsold is about $30,000, supplemented by legislative appropriation, making the net annual income $175,000. The university buildings, which are on a campus of forty acres, are valued at $200,000. Courses are offered in science, literature and arts, law, pharmacy, forestry, journalism, music, domestic science and commerce and accounting; and there are also maintained a school of education, a university extension department, correspondence courses, a bureau of public information, a summer school and a biological station. Tuition is free to students residing in Montana. The university is equipped with a library of 35,500 volumes; it has a faculty of over sixty members and a student enrolment in 1915-1916 of 1,028. J.D.D.

MONT BLANC, *mawN blahN'*, meaning *white mountain,* is the highest mountain of Europe, the most famous peak on the Continent, and one of the most notable in the world. It is situated in the Pennine Alps, the loftiest and most important range of the Alpine system. The mountain lies southwest of Alleé Blanche and northeast of the beautiful vale of Chamouni, in the province of Haute Savoie, France, near the frontiers of Italy and Switzerland. The huge mountain mass, composed

chiefly of granite, is about thirty miles long and ten miles wide. The highest of its several summits, which is in France, rises 15,782 feet. The lower slopes are covered with dense woods penetrated by swiftly-rushing streams. Great glaciers creased with deep crevasses cover the summits and upper slopes. The most remarkable of these glaciers is the *Mer de Glace,* winding down the north slope towards Chamouni and giving rise to the River Arve.

The dangerous ascent of Mont Blanc was first accomplished in 1786 by Jacques Balmat, a guide, and shortly afterward by Dr. Paccard, a local physician. In the following year De Saussure, the naturalist, reached its summit and in 1840, when the Italian naturalist, Imperial de Sant-Angelo, made the ascent, thirty-three daring travelers had preceded him. The whole journey can now be made in fifty or sixty hours. Natives of the region act as guides and several lodges for the shelter of tourists have been built along the passes.

MONTCALM DE SAINT-VERAN, *mohN kahlm' de saN va rahN',* Louis Joseph, Marquis de (1712-1759), a French general who gave his life for his country in the last great struggle between the French and English for supremacy in America (see French and Indian Wars). He entered the army when a boy of fourteen, won distinction in the War of the Austrian Succession, and in 1756, having then attained the rank of brigadier-general, was appointed to the chief command of the French forces in Canada. His operations against the English were at first brilliantly successful, including the capture of Fort Ontario and of Fort William Henry, on Lake George, and the occupation of Ticonderoga. As the war progressed it became evident that the crucial point of the struggle would be the English attack on Quebec, in preparation for which Montcalm concentrated his main forces before the city early in 1759.

In July the gallant English commander, General Wolfe (see Wolfe, James), made an unsuccessful frontal attack; a few weeks later, in September, by means of a narrow pathway he scaled the heights above the city and led out his whole force upon the Heights of Abraham. There, on the thirteenth of the month, the French and English armies met in open battle, and Canada was won for England. Wolfe died on the field in the moment of victory; his opponent, who was also mortally wounded, lived until the next morning. His last words were, "Thank God, I shall not live to see the surrender of Quebec." A noble monument to the memory of Montcalm and Wolfe has been erected on the battlefield, and to the French inhabitants of Canada Montcalm is as much of a national hero as is Wolfe to their English neighbors in other parts of the Dominion.

MONT CENIS TUNNEL. See Cenis.

MONTCLAIR', N. J., in Essex County, is a residential city in the northeastern part of the state, seven miles north and west of Newark, and fifteen miles northwest of New York City. It is on the Erie and the Delaware, Lackawanna & Western railroads, the Morris Canal and electric interurban lines. The population in 1910 was 21,550; in 1916 it was 26,318 (Federal estimate).

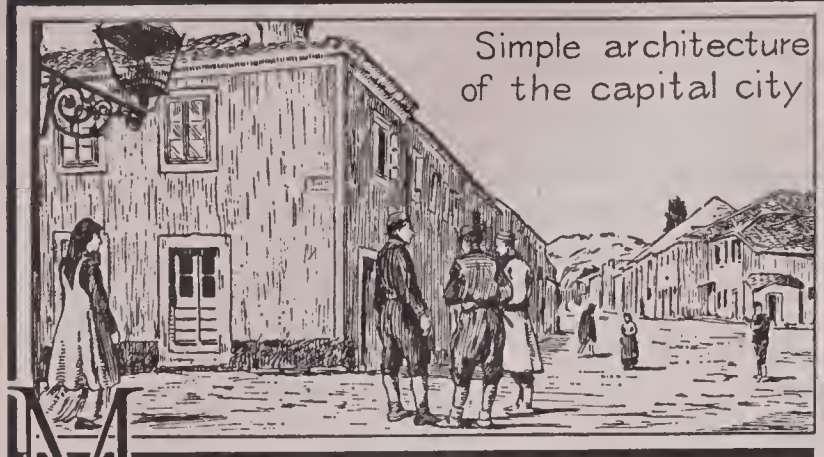
Montclair is principally the home of Newark and New York business men. Situated at the base and along the slope of the Orange Mountains, the streets rise one above another and offer splendid views of the surrounding country. From the highest altitude of the town, 650 feet, may be seen New York City and its harbor. The principal buildings are the Carnegie Library, the municipal building, the high school building, costing $650,000, Montclair Art Museum, club buildings and churches. The city has a state normal school, Montclair Military Academy, Mountainside Hospital and two orphan asylums.

The lower part of the town, known as Cranetown, then as West Bloomfield, was settled first and was a part of Newark, later a part of Bloomfield. Upper Montclair was first called Speertown. The name Montclair was adopted by the two sections in 1865, and they were incorporated as a town in 1894. H.L.M.

MONTE CARLO, *mohn'tay kahr'lo.* See Monaco.

MONTE CRISTO, *mohn'tay krees'toh,* a small barren island about twenty-seven miles south of Elba, in the Mediterranean Sea, belonging to Italy. It rises 2,000 feet above the sea and for many years remained uninhabited, but a penal agricultural colony was established there in 1874. The fame of the island is due to the elder Dumas, who gave the name to the hero of one of his most popular romances.

The Count of Monte Cristo. This great story, by Alexandre Dumas, was written in 1844 and 1845. The most thrilling part is the hero's discovery of fabulous treasure on the island of Monte Cristo, and of his escape from the Chateau d'If after fourteen years' imprisonment. The book was dramatized, and the play was given for years by leading actors, particularly James O'Neill.



Simple architecture of the capital city

THE STORY OF MONTENEGRO

National costume

MONTENEGRO, *mon ta na' gro,* a small and ruggedly-picturesque European kingdom, situated in the western part of the Balkan Peninsula. Early in the War of the Nations, which began in 1914, it was unfortunately in the path of the southerly drive of the Austro-German armies, and after stubborn resistance gave way to overpowering military strength and lost its identity as a sovereign state. Its aged king and queen fled to Italy, the government was practically disbanded, and German arms ruled the little country. This article will describe the Montenegro of 1914, picturing conditions as they then existed and to which the nation may some day return.

Montenegro is quite irregular in shape, and lies between Austrian Dalmatia on the west, Herzegovina on the west and north, Serbia on the east and Albania and the Adriatic Sea on the south. Covering an area of 5,603 square miles, it is only a little larger than the state of Connecticut, and its population of about 516,000 is not quite half as great as that of the American state.

The name Montenegro means *Black Mountain,* and many explanations of its origin are given. One belief is that the name was suggested by the dusky appearance of Mount Lovchen in the south, under whose shadow lies what is known as "the cradle of Montenegrin liberty," the Katunska, or "Shepherds' Huts."

The People and Their Occupations. The Montenegrins are a primitive, warlike Serbian race speaking a Serbian dialect. The men are tall, muscular and well-proportioned. They are vain and lazy, but as warriors are brave, patriotic and chivalrous. No matter what they may be doing, they are usually fully armed, and military service is compulsory between the ages of eighteen and sixty-two. The women, though often beautiful when young, age quickly and remain short and stunted, for upon them falls the hardest work at home and in the fields. They are treated as inferior beings. Whereas the men wear gayly-colored, picturesque costumes, the women are usually attired in black.

Most of the houses in rural districts are of stone, with one door, one window and a straw roof without a chimney. Around each dwelling is usually a little plot of land planted to wheat, maize and potatoes, for the principal food consists of cheese, potatoes and maize

LOCATION MAP

(*a*) Montenegro	(*g*) Bulgaria
(*b*) Italy	(*h*) Serbia
(*c*) Germany	(*i*) Albania
(*d*) Austria-Hungary	(*j*) Greece
(*e*) Russia	(*k*) Turkey
(*f*) Rumania	

cake, meat seldom being eaten. Primitive methods are still employed in agriculture, and stock raising is the most important industry. Cattle, sheep, goats, wool, hides and skins are exported. Tobacco, grapes and olives are raised to some extent, but the tobacco industry

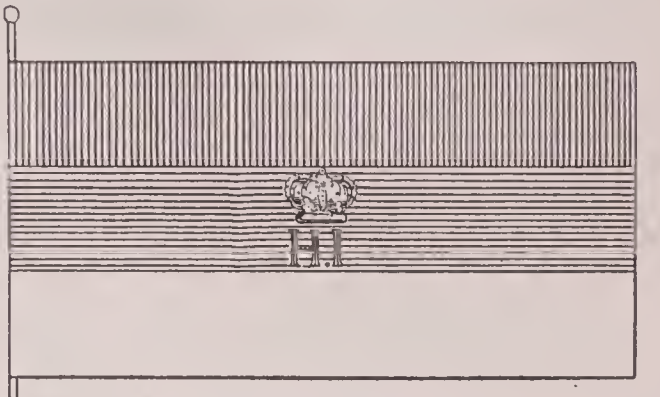
is in the hands of an Italian syndicate. Fine forests of oak, beech and pine in the mountains of the north are valueless, owing to lack of roads. The leaves of the sumach, used in tanning and dyeing, and pyrethrum (an insect powder obtained from the chrysanthemum) are articles of export.

Most of the Montenegrins are of the Orthodox Greek Church; others are Roman Catholic and Mohammedan. Although education is free and compulsory, the number of uneducated people is large.

The Country. The surface is principally mountainous, with here and there a few beautiful plains and valleys. The important streams are the Moratcha and the Zeta, which empty into Lake Scutari at the south. Some of the mountains rise to a height of 8,000 feet and are continually snow covered. The climate varies from severe, continuous cold in the high regions, to mild days in sheltered valleys. The average annual temperature is 58°. The vegetation ranges from Alpine on the summits, through forests of pine, beech and oak, to olives, oranges and crimson-blossomed pomegranates in lower regions at the south. Bears, wolves and foxes roam over wide areas. Hares are abundant where herbage is rich. Eagles, vultures, owls, nightingales, larks, herons, pelicans and ducks abound. Fish are numerous, the most important being the bleak, which is exported in large quantities.

Cities and Communication. The capital city is Cettinje, in the southwestern part of the country. Good carriage roads connect that city with others in all directions. Excellent roads also lead from Antivari and Dulcigno, seaports on Montenegro's twenty-eight miles of coast. Bridle roads are everywhere. A narrow-gauge railway about ten miles in extent connects Antivari with Vir Pazar on Lake Scutari, and steamers on that lake afford communication with other points. The construction of another railway from Antivari to Nikshich in the north has been begun. Telegraph lines connect the principal cities.

History. During the Middle Ages Montenegro formed part of the Serbian kingdom. When that realm was destroyed by the Turks in 1389, Montenegro became an independent principality, which then covered about 1,600 square miles. In spite of continuous struggles with the Turks, the Montenegrins bravely upheld their independence through the centuries. From the early part of the sixteenth century the ruler of the country was an elective prince-bishop, or vladika. In 1855 the vladika, Danilo, took the title of prince and transformed the land from an ecclesiastical to a secular principality, and its independence was soon recognized by Russia. In 1862 a not altogether successful war was waged against Turkey. Fourteen years later Montenegro again went to war with Turkey and gained large additional territory by the Treaty of Berlin, increasing its area to about 3,500 square miles. In 1912 Montenegro joined the other Balkan States in a war against Turkey, which further loosened Turkey's hold in Europe and added more territory to the kingdom of Montenegro (see BALKAN WARS). In August, 1914, Montenegro joined Serbia in war against Austria-Hungary and Germany and so became a factor in the War of the Nations (which see). Montenegro shared with Serbia the fate of a conquered nation as a result of the Germanic drive in 1915. O.B.



MONTENEGRO'S FLAG

Vertical lines represent red in the flag; horizontal lines, dark blue; plain surface, white. The crown and letters are red and gold.

Consult Trevor's *Montenegro, a Land of Warriors;* Denton's *Montenegro, Its People and Their History.*

MONTEREY, *mon te ra'*, the most important manufacturing city of Northern Mexico and the capital of the State of Nuevo Leon, is situated on the small Santa Catalina River, about forty-five miles northeast of Saltillo. It is about a hundred miles from the international boundary. When political conditions in Mexico permit, Monterey is frequented as a winter resort by residents of the Southern United States on account of its mineral springs and its charming situation at the head of a beautiful valley. In the vicinity are rich lead, copper and silver mines, and the city has important smelting works, iron foundries and woolen mills. The streets are good, and the houses are built of stone in the Moorish style. American capital had been heavily invested in and near the city before the beginning of the revolution in 1913. Population, 1910, 78,528.

MONTEREY, Battle of. An important battle was fought September 24, 1846, in Monterey, Northern Mexico's principal stronghold during the Mexican War. General Taylor, with an American force of about 6,000 men, stormed the fortified city, which was defended by a Mexican force of 10,000 under General Ampudia. After four days of hard fighting the Mexicans surrendered. It was hoped that this battle would end the war, but Mexico continued to fight, though weakened by a long course of revolutions. The Americans, however, captured one after another of the Mexican cities until the City of Mexico, the capital, was occupied. Peace was concluded by the Treaty of Guadalupe Hidalgo, in February, 1848. See Mexican War.

MONTE ROSA, *mohn'tay ro'zah,* a snow-clad mountain mass in that portion of the Alps which forms the boundary between Piedmont, Italy, and the Swiss canton of Valais. Mont Blanc alone, among the Alpine mountains, surpasses Monte Rosa in altitude. The latter has eight main peaks, all more than 13,000 feet in height, and the loftiest of these, the Dufour Spitze, is 15,217 feet above the sea; its summit is less than 600 feet below that of Mont Blanc (which see). Monte Rosa has deposits of iron, copper, gold, mica, slate and gneiss, and there are several mines on its slopes. The steep, glacier-robed sides of the mountain make it very difficult to ascend, and its lofty passes are full of peril to the traveler.

MONTESQUIEU, *moN t' skyeh,* Charles de Secondat, Baron de la Brède et de (1689-1775), a French satirist and philosophical writer, whose *Persian Letters* won him immediate fame on their appearance in 1721. These letters purport to be the correspondence of two distinguished Persians traveling in France, and their criticisms of French life in all its phases are no less noteworthy for their humor than for their justness. Other important works were a history of Rome and *The Spirit of the Laws,* a standard work on certain phases of political science.

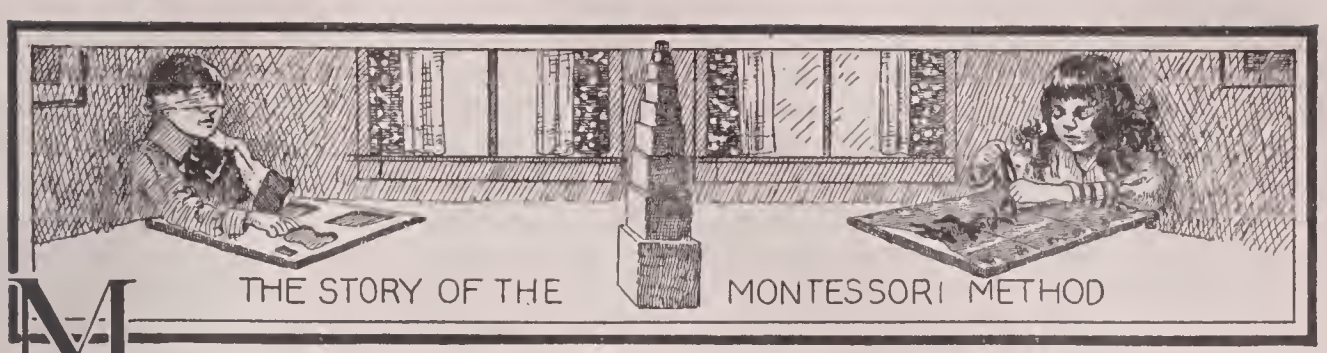
Montesquieu was born near Bordeaux, studied law and became eminent in his profession, but cared little or nothing for the routine of ordinary practice. For some years he was president of the parliament of Bordeaux. Though he had satirized the Academy in his *Persian Letters,* he was elected a member of that body in 1728.

MONTESSORI, *mon tes so'ree,* Maria (1870-), an Italian educator whose theories of child training have been widely adopted in Europe and have gained entrance into America. Maria Montessori is the only child of middle-class Italian parents. As a beautiful and gifted young woman, she gave evidence of unusual strength of character when she announced her determination to prepare herself for the medical profession. Such a procedure at that time was revolutionary, for she was opposed by the strongest of all barriers—social prejudice and tradition. She persisted, however, and in 1894 was awarded the degree of Doctor of Medicine by the University of Rome, being the first Italian woman to receive that honor. How she was led into the work for which she has become so widely known, and the principles and methods for which she stands, are fully treated in the article following, describing the Montessori Method.

MADAME MONTESSORI

Madame Montessori is a woman of vision. In one of her books she says, "Whoso strives for the regeneration of education strives for the regeneration of the human race." This statement represents the scope of her interests. Her devotion to the cause of child training is one expression of her love for humanity and her belief that the human race can develop only when it is given spiritual and intellectual freedom. She has identified herself with the woman's movement, and represented Italy at the International Woman's Congress in Germany, in 1898. Her efforts in her own city of Rome have met with opposition from religious and educational sources, but she won the support of the Queen Mother Margherita, through whose influence there was established a Montessori school in the Convent of the Via Giusti. In 1907 a school was opened in a tenement house in one of the poorest districts in Rome. Other schools followed, and thus was begun a movement that has gained world-wide significance. Montessori schools have been established in France, England, Smyrna and America.

Consult: Dorothy F. Fisher's *A Montessori Mother;* A. T. Smith's *The Montessori Method;* F. E. Ward's *Maria Montessori and the American School;* William Boyd's *From Locke to Montessori.*



MONTESSORI METHOD. Dottoressa (Doctor) Maria Montessori began her career as a doctor of medicine, graduating brilliantly in medicine and surgery, at the University of Rome, when in her early twenties. She was the first woman in Italy to achieve this distinction, marking perhaps, in her courageous and single-handed struggle against almost unanimous opposition, the first step in her remarkable career of daring and innovation.

How the Method Developed. It was in her postgraduate days, during which she was occupying the position of assistant doctor at the psychiatric (mental disease) clinic of the university, that Dr. Montessori became interested in the treatment of feeble-minded children, with whose miserable lot in Rome at that time she came closely into contact. Drawn by the helpless appeal of these unfortunate children, who then received treatment no different from that given the actually insane, and perhaps conscious of a special vocation, she was led to specialize in this direction. Abandoning an already extensive private practice, she undertook the direction and reorganization of the state orthophrenic school, or asylum for deficient and feeble-minded children; this position she held for two years, giving her services gratis, and working from early morning till late at night. At the same time she gave free courses of lectures to teachers on the observation and training of defective children. In this work she may be said to have achieved her first striking success, children from her institute actually passing the state examination in reading and writing held for normal children.

The methods which she used in this institute were largely derived from the work of two men, whose influence may be traced throughout her subsequent development. Itard and Seguin were pioneers in the educational treatment of the mentally deficient. Itard had gained his principal experience in the training of a boy, "the savage of Aveyron," who had grown up abandoned to a life of nature in complete isolation from the society of man; and Seguin had devised means whereby deficients could really attain many of their normal powers, his methods, in his own words, following "the natural physiological development of the organism."

From the first, Dr. Montessori felt that there was nothing in the methods she was using inherently limited to the instruction of deficient children. "While everyone," she writes, "was admiring the progress of my idiots, I was searching for the reason which could keep the happy, healthy children of the common schools on so low a plane that they could be equaled in tests of intelligence by my unfortunate pupils.

"I believed that these methods contained educational principles more rational than those in use . . . and that similar methods applied to normal children would develop or set free their personality in a marvelous and surprising way." This idea was shortly to take absorbing hold of her mind, and led to renunciation of her work with deficients for the wider sphere of education of normal children.

Giving up every other occupation in order to broaden and deepen her conception, she reëntered the University of Rome as a student in pedagogy and philosophy, also studying experimental psychology and making researches in the schools in the science of man (anthropology). The last named led to her acceptance of a chair in Pedagogical Anthropology at the University of Rome, in which subject she delivered free courses of lectures for four years. At this time, also, she devoted herself to a more thorough study of the works of Itard and Seguin, translating them and copying them out with her own hand into Italian in order more fully to absorb their meaning. She also traveled in Europe, visiting schools and studying all aspects of modern pedagogy.

In 1906 the great opportunity came to her of testing her ideas in a practical way. An industrial society had undertaken the reform of some of the badly-constructed tenement dwellings in the poor quarters of Rome. These large blocks of apartments had been built hurriedly at a

time of building speculation, and then becoming unoccupied, had fallen into disrepair. They had finally become the homes of the poorest of the poor, and because they had been designed for better-class families, all the evils of subletting and lack of privacy had set in. The society bought up these buildings, modified them to give sufficient light and air, divided up the apartments by partition walls, and relet them to the poor at reasonable rents. The society provided the inmates with certain advantages, such as a communal wash-house, baths, and sewing-room, and also laid out the courtyards with trees, flower beds and grassplots. The experiment was found to be a profitable one for the company in addition to the benefit derived by the tenants.

In return for this, the inmates were required to keep their homes clean and in order, and to respect the walls, stairs and courtyards of the building. It was found necessary, however, to provide some supervision during the day for the children under school age of the families in the tenement, since these, being still little vandals, and being left uncontrolled during the working-day of their parents, threatened to offset all the good which had been accomplished in securing the coöperation of their elders in the care of the building.

A large room was therefore set aside in each tenement for the supervision of these infants during the day, and this part of the scheme, under the fortunate title "Casa dei Bambini," or "Children's House," Dr. Montessori was invited to organize. Needless to say, she accepted the commission gladly. The first "Children's House" was opened in the Quarter of San Lorenzo, in January, 1907. A second followed shortly in the same Quarter, and then a third in a better-class district of Rome. But after working in these daily for two years, and succeeding in evolving her "method" for little children, Dr. Montessori unfortunately had little more influence in these buildings. Schools using her methods, however, soon sprang up under many different authorities in Rome and in other parts of Italy, and in the seven years which have passed since their commencement, Dr. Montessori has been able to verify and perfect her methods under many diverse conditions, both for rich children and for poor.

The schools which thus came into existence were shortly to become world famous. Some articles describing them appeared in *McClure's Magazine,* which attracted widespread interest. These were followed by others, and shortly afterwards by a book by Dr. Montessori herself, translated into English from the original Italian. This book, under the title *The Montessori Method,* was highly successful; easily the most popular work on education of late years, it rapidly achieved a circulation such as few books in any sphere have recently enjoyed. In England it was also widely read, and translations before long appeared in all the principal European languages, and also in Chinese and Japanese.

The new principles advocated naturally aroused much discussion in the educational world, and in a short time a considerable bibliography dealing with the method sprang up. Numbers of Montessori schools have been started in the United States of America, many also in England, and others in France, Germany and Switzerland; the latter country has transformed into Montessori schools its orphan asylums and infant schools in certain cantons.

The "School Within the Home." Before proceeding to a description of Dr. Montessori's methods, a word may be said about a characteristic feature of her first schools, namely, that they were situated in the same building as the homes of the children. Under such conditions the children do not have to "go out" to school, and the feeling of strangeness and separation from home is avoided. The child when he eventually goes to the state school already knows what school is. In addition to this, the mother working at home is constantly near her little ones; from the window she can see her child playing in the garden, or be ready to run to his assistance at the sound of his cry. This greatly adds to the child's contentment at school, and forms a valuable condition of a school environment for children of this age.

A greater advantage, however, is a social one, the effect which the school has upon the adult members of the community in which it is situated. In the reformed tenements, in which a higher standard of life had been made possible, this was little short of miraculous.

The neighborhood in which Dr. Montessori began her work was one, perhaps, hardly to be equaled elsewhere in the world in poverty and wretchedness, with their inevitable accompaniment of crime and vice. In the overcrowded houses, families lived in conditions of appalling depravity and squalor, several families sometimes occupying the same room, sleeping crowded together with little light or ventilation, and the children often witnessing disgusting scenes of violence and sensuality.

The school, amid such a people, was able to have an uplifting influence, setting an example of cleanliness and order, and coming, in its pleasant atmosphere of happiness and peaceful occupation, like a ray of sunshine through the dark clouds of squalor and oppression which overshadowed their lives.

Perhaps, in a moment of depression, you have once chanced upon one of those quiet retreats; some monastery or nunnery, in which the inmates seem to live undisturbed by the bustle and turmoil of the world about them, and go about their duties with serene, cheerful faces, loving one another, and extending kind hospitality and confidence to the stranger who may visit them. If so, you will have felt a kind of reinvigoration, like a draught of clear water to one who is thirsty. It is a glimpse of another life wherein the needs of the spirit seem to find promise of satisfaction. And one leaves with a sense of encouragement, almost with an ideal, which remains as a warm remembrance in the heart, and as a help and uplifting influence in life.

Similar to this is the effect of these "Children's Houses" among the homes of the poor. Here is a room in which there is peace; all is orderly, clean and pleasing to the eye. Its inmates move about with clear, happy faces, and eyes which express an inner joy. No harsh word is heard, but only the hum of contented activity, the voices of little beings busily employed. Occasionally music bursts forth, a simple march or song, a pretty tune, which the teacher plays for the children to listen to. Then, if there is a garden, the children have here planted shrubs and flowers, and made a nature beauty spot in the midst of slumland.

A little community has sprung up, creating its own atmosphere of happiness and contentment, and representing the attainment of higher possibilities of human life. Little wonder that the "Children's House" became a source of inspiration in the tenement. Parents, who before seemed too low for any hope of redemption, began to send their children to school well dressed and washed. The children themselves, in fact, were unhappy, or refused to come unless they did so, thus bringing the message of the school into the homes and lives of the parents. Flowers began to appear on window sills; and the walls of staircases and corridors and the cleanliness of yards began to be respected.

The presence of the school, in fact, seemed to act as a balm of healing, forming a center of new ideas, and of inspiration and encouragement; for children, undoubtedly, have an entry to the heart which is closed to other appeals, uplifting the life about them, like real redeemers from a better land.

The teacher, also, has a great opportunity for social work. Owing to the reformed building, she is able to live near her school in the same tenement as the children's parents; and in this position she is able to become intimately acquainted with them. Through a winning and cultured personality she is able to gain their confidence and find countless opportunities of giving advice, and of helping to raise and purify the lives about her.

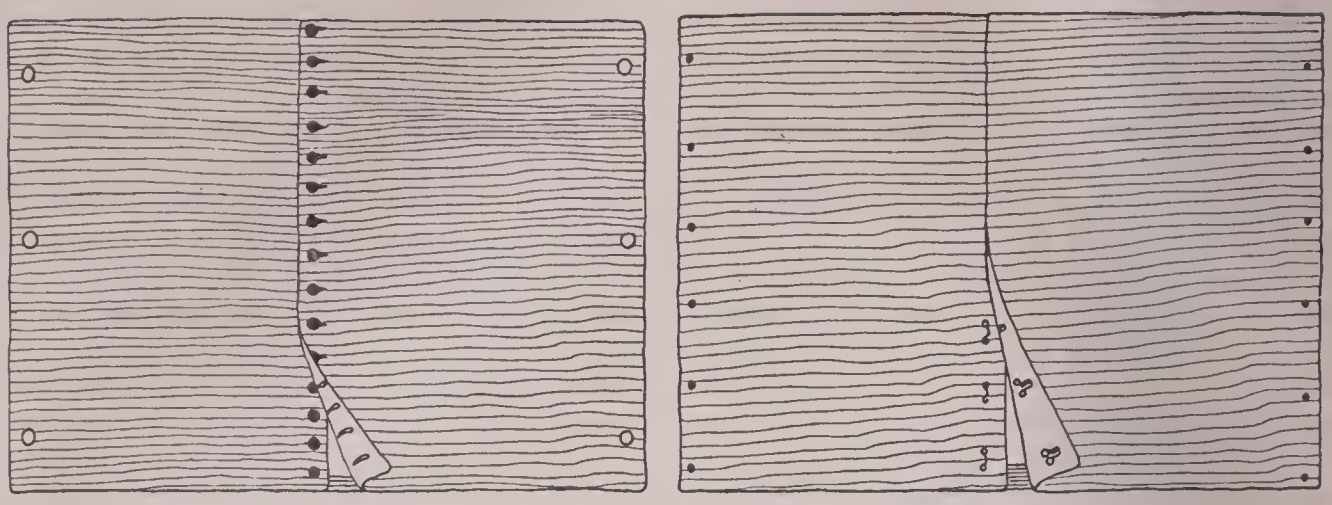
The "Children's House"

An ideal "Children's House," as Dr. Montessori conceives it, would consist, not of one room only, but of several communicating with one another, and it would also have a garden. The rooms should include a gymnasium, a dining room and a little parlor, or common room, in which the children can rest or play when not at work in the large working room. Such ideal premises, however, are not essential to the practice of the method, and excellent results have been obtained in a single large room, even without a garden.

The rooms should be prettily furnished and decorated, and made as homelike as possible. An important feature of the furnishings of the "House" is that they are all of dimensions suited to the children. The chairs and tables are low, as also are the cupboards, pegs, basins, the blackboards hung upon the walls, and all the other articles which the children use.

The children also have *charge* of their house. They have to keep it clean and in order, wait upon themselves, and do all the practical operations connected with their life. They lay the tables for meals, wait upon one another at table, wash up, sweep the floor, wash the chairs and tables, brush the carpets and little mats which they use, clean their own shoes, and so on. The "Children's House," in fact, is really what its name implies, a house made for children, of which they are the masters.

Dr. Montessori also insists that the objects which the children use shall be fragile, that is, not of the unbreakable pattern which it is common to give children to-day. The drinking tumblers are made of glass, the plates of china.

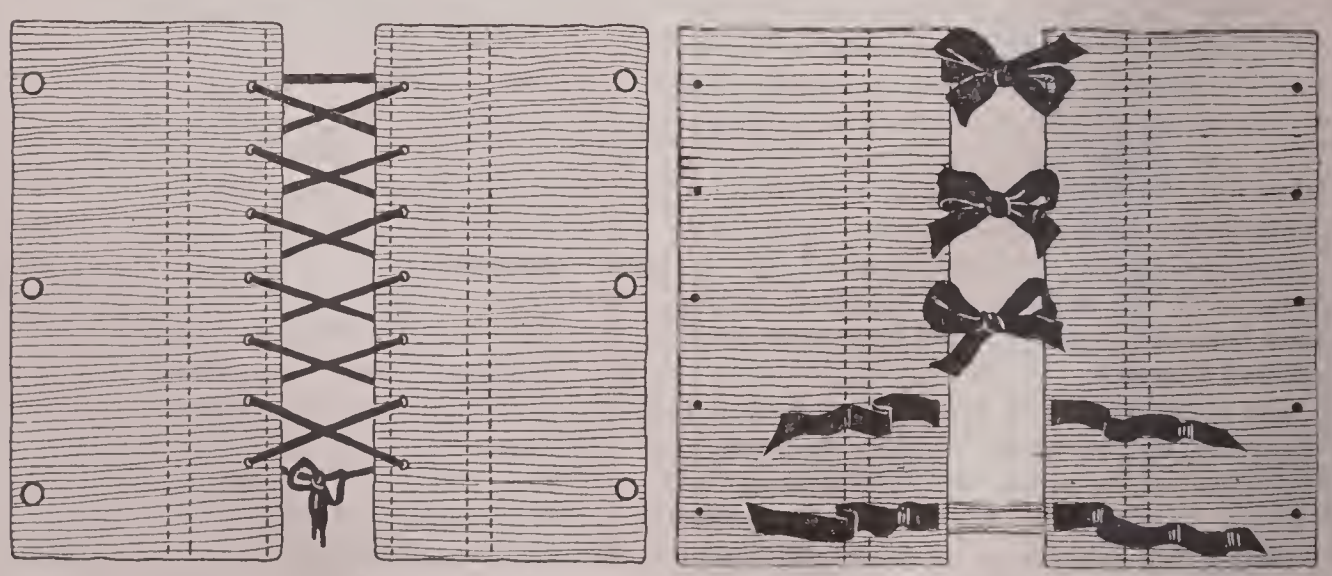


FRAMES FOR EXERCISES WITH BUTTONHOOKS AND HOOKS AND EYES

The chairs and tables are light, so that they move and make a noise if the children knock against them. An environment of this kind is *sensitive* to the child's mistaken movements. The child who moves badly and causes a chair to grate upon the floor is denounced by the resulting noise. The glasses and plates which he carries are breakable. Erroneous movements are thus revealed to him, and he tends to correct them and perfect his muscular control. If, instead, the chairs and tables are heavy, or fixed to the ground, and the utensils which he uses are unbreakable, the child may make many mistaken or clumsy movements without being aware of them, and may then form habits difficult to break later.

These activities of the children, in fact, have not only a practical value, but also an educational one, since through them the child gains control of his muscles. The coördination of the movements forms one of the principal parts of the child's physiological development at this age; and to provide opportunity for intelligent and purposeful activity is therefore to respond to a vital need of his life. In the "Children's House," the grace and deftness of the children's movements are clearly marked. The ease and certainty with which a child will carry a glass of water, or a little toddler of four carry around a tureen of hot soup to his companions at lunch, forms a striking contrast to the usual helplessness of children of this age. Instead of being prevented from moving, and made to sit still, in order to obtain order and quietness in the room, the children learn to move without creating disorder.

The Frames. Another of the operations of practical life which the children learn to do for themselves is that of dressing and undressing. To assist them in acquiring this accomplishment, Dr. Montessori has designed a series of light wooden rectangular frames, to two opposite sides of which are attached pieces of cloth or leather, as the case may be, which can be fastened together down the middle of the frame by means of buttons, hooks and eyes, bows, lacing, etc.; in fact, by all the different modes of fastening of which man makes use.



FRAMES FOR EXERCISES IN LACING AND TYING

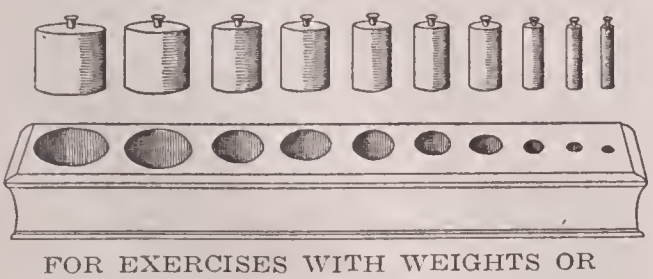
The child can seat himself comfortably with one of these before him at a table, and practice the given operation at leisure. Each of the processes, such as buttoning, lacing, tying bows, etc., represents problems to the child at first; problems, not only to his mind, but also to his fingers, which have not yet learned to make the necessary movements. Practicing them separately, therefore, isolated from the other difficulties with which they are combined in dressing, enables him to acquire skill in these movements much more quickly than if he only encounters the exercise in practical life.

Dr. Montessori lays stress upon the exercises of practical life from still another point of view, namely, that they lead the child to become independent of the help of others. This is an addition to his liberty. "In reality, he who is served is limited in his independence." This concept will be the foundation of the dignity of the man of the future—"I do not wish to be served *because* I am not an impotent." And this idea must be gained before men can feel themselves really free.

The Education of the Senses. In Dr. Montessori's method considerable importance is attached to the education of the senses. During the period of growth in which they are in process of development, exercises which contribute to the education of the senses are spontaneously attractive to the children, and they repeat them with evident interest and pleasure for long intervals of time. This is also the period in which a systematic training of the senses is most effective.

The apparatus used in the education of the senses is too extensive to be here described in detail, but the following examples will illustrate its nature and principles:

(a) *The Cylinders.* These, which may be given to the youngest children, consist of a series of ten wooden cylinders which fit pre-

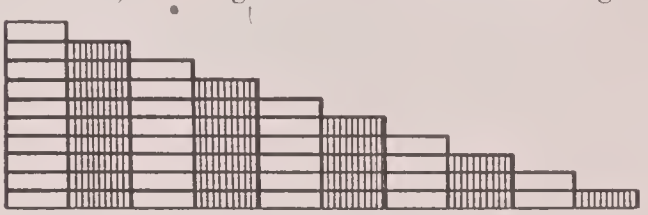


FOR EXERCISES WITH WEIGHTS OR CYLINDERS

cisely into a row of holes in a block of wood They vary gradually in dimension, from the largest at one end to the smallest at the other. The child plays with these, taking them out of their holes, mixing them upon the table, and then striving to replace them. The exercise is one in visual perception, requiring the child to perceive similarities and differences of form. For children of two and a half to three years of age this game has great fascination, and they repeat the exercise, taking out the cylinders and replacing them an indefinite number of times.

There are three blocks of cylinders; in one of these the cylinders vary in diameter only, in another in height only, and in the third, in both dimensions.

(b) *The "Long Stair," the "Broad Stair" and the "Tower."* These consist (1) of a series of ten rods, differing from one another in length

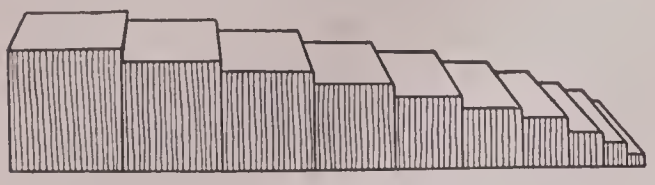


THE "LONG STAIR"

by ten centimeters at a time, and forming a gradation from a rod of ten centimeters to a rod one meter in length; (2) of a series of ten square prisms, differing in the side of their cross section by one centimeter at a time, from a prism measuring one square centimeter in cross section, to one having a cross section ten centimeters square; the game with these consists in arranging the rods or prisms upon the floor or table, in order of gradation; (3) a series of ten cubes varying in size from a cube having an edge of one centimeter to one with an edge of ten centimeters. These are built one upon another in order of size, commencing with the largest at the bottom.

(c) *The geometric insets.* To train the eye in the perception of *form,* an apparatus is used consisting of flat geometric figures, cut out of wood, and fitting into corresponding holes in flat wooden squares, or "frames." A selection from a large number of these, comprising circles of different sizes, squares, rectangles, triangles and polygons, may be presented to the child, who has to take out the figures, mix them and replace them in their corresponding apertures. To this exercise, which is one of vision, may be added an exercise of the muscular sense, the child passing the tips of his first two fingers around the contours of the figures and of the frames. It is often seen that a child who finds difficulty in replacing the figures by means of his sight alone, does so easily, having "touched" them. (See illustration, page 3921, and panel at head of this article.)

(d) *The Colors.* These consist of flat wooden spools, upon which are wound colored silks. There are sixty-four colors in all, composed of eight series, or gradations. Each gradation con-

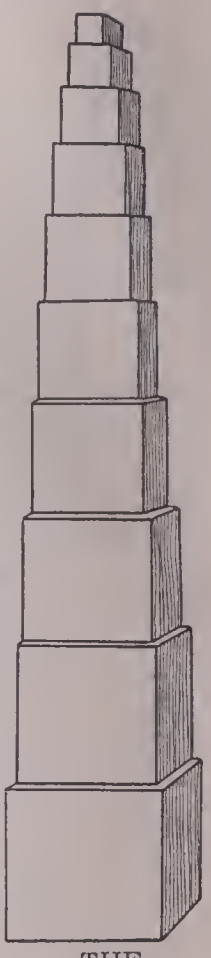


THE "BROAD STAIR"

tains eight spools of the same color, but varying in intensity from light to dark. A double set of these colors is provided.

In the simplest exercise with these, the child is presented with two or more pairs of similar colors; for instance, two blues of the same shade, two reds, two yellows, etc. The game consists in mixing these upon the table, then finding the corresponding pairs and arranging them in couples. A more difficult exercise is that of arranging a series in order of gradation. To this may then be added a second series, then a third, and so on, till the child is able to sort a confused heap of the whole sixty-four colors into a beautiful shaded "mat" upon his table.

Other sense exercises include those for touch—rough and smooth surfaces, stuffs, etc.; little wooden tablets for the baric sense, or perception of weight; sound boxes and bells; beans, counters, Froebel cubes, or other objects for educating the stereognostic sense, or the muscular and tactile sense combined, by which we perceive the nature and form of bodies by handling them. During many of these exercises the children's eyes are blindfolded. This adds to their interest, and also fulfils a technical condition in sense training, namely, that the sense to be educated shall be isolated. Unless this is done, the child is likely to depend too much upon one sense—most frequently the sense of sight—and to sacrifice the fine development of the sense of touch. The "silence" game described below illustrates the same point.



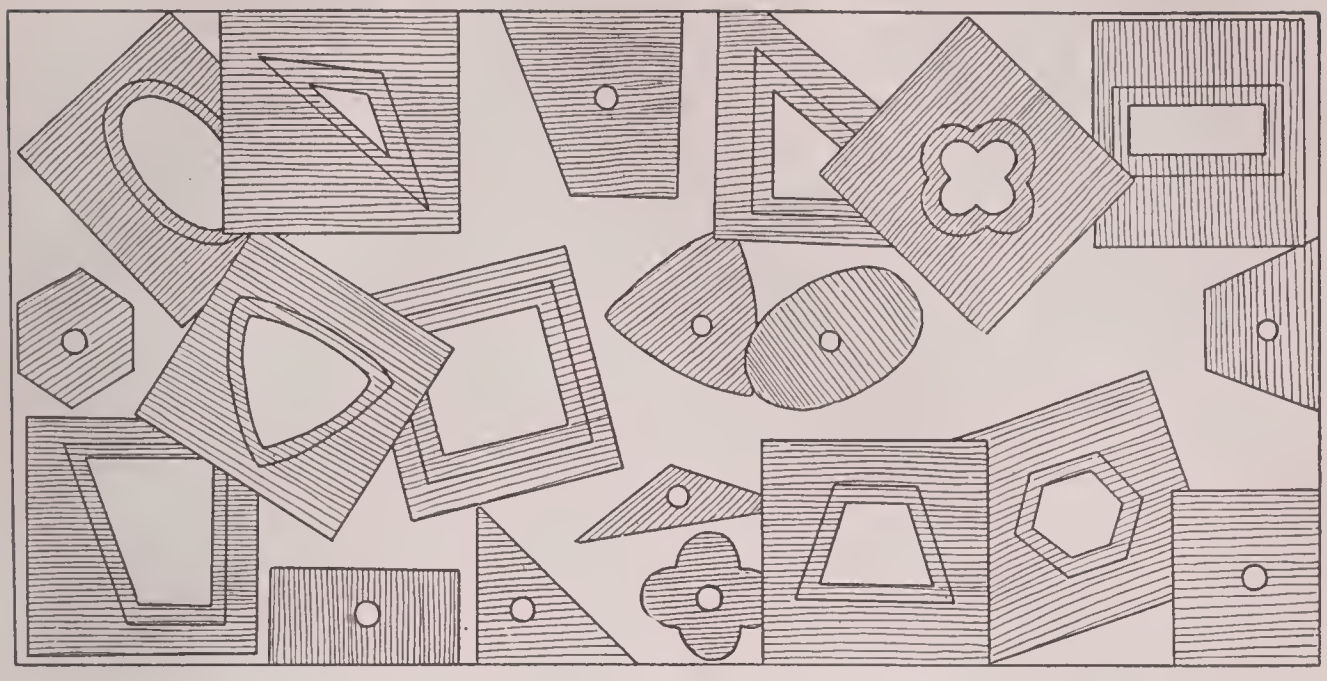
THE "TOWER"

Sense Education

The importance to the individual of sense education is too large a subject to be here dealt with, but its value may be readily appreciated if it be considered that in the generally-accepted view of modern science, the whole of man's conscious life is built upon the impressions which he receives from the external world by means of the senses. Some other aspects of the question, however, may be profitably touched upon. The fact, for instance, of the child's spontaneous use of this material is a deeply interesting one. It is evidently something more to him than a game, since it would also be this to a much older child; while it is only children of a certain age who interest themselves in the exercises for any length of time. Such children, however, are seen to repeat the same exercises an indefinite number of times, taking out and replacing the cylinders, for instance, ten, twenty, or thirty times in succession, and this on many consecutive days, sometimes for several weeks.

Similarly, the exercises with the colors, the cubes, and so on, are continual sources of interest, and children repeat them spontaneously for long intervals of time, returning to the game repeatedly during many weeks and months. These exercises, in fact, appeal to the child during that period of his development in which the senses themselves are in process of formation. It is because they correspond to and help this physiological process, that the child delights in them, and finds in them a deep attraction, which is truly a vital manifestation of his life. Perhaps Henri Bergson expresses a great truth, of which we here find an example. In an essay entitled *Life and Consciousness,* he says, "Philosophers have not sufficiently remarked that Nature has taken pains to give us notice every time her destiny is accomplished; . . . she has set up a sign which apprizes us every time our activity is in full expansion: this sign is joy . . . we find that wherever joy is, creation has been, and that the richer the creation the deeper the joy."

The work of the children in the "Children's House," in fact, may almost be said to be *characterized* by expressions of joy. The children work happily and contentedly, an occasional cry of delight bursting from one of them who has succeeded in some new accomplishment, to attract the attention of the teacher,



EXERCISES IN GEOMETRIC INSETS

or to call his companions to come and admire. It is a joy which they feel in their own self-development, and which gives a characteristic expression of calm and brightness to their faces; for their life is one of continual expansion, and of joyous unfolding and exercise of their increasing powers.

It may be objected, "But would not the senses also develop without special apparatus by practical use in the environment?" Assuredly, but not with the same facility, or to the same degree of refinement. Above all, not with the same *certainty*. If the child's surroundings, for instance, be lacking in color, as is so often the case in our drab cities of dull gray and limited sunlight, his color sense will be deprived of the stimuli which it needs for its development. For the refinement of a sense, too, it is necessary that it have practice in making fine discriminations. The child, for instance, who distinguishes between two cylinders differing very slightly in size, performs an exercise in visual discrimination with which he would rarely meet in his ordinary surroundings. The child wishes to touch and handle objects, and goes in search of experiences of this kind, but if his environment is unsuitable, or he is impeded by adults, he is unable to satisfy this need. In fact, it is often rebellion against this unconscious suppression of their expanding life which accounts in great part for the so-called "naughtiness" of children of this age.

The apparatus therefore provides the children with an organized and orderly means of finding those experiences in handling objects and refining their senses, of which they have need. The child who has the advantage of it might be compared to the student at a university, who finds there all the material for his study already collected and arranged for his assimilation; contrast such a one with the student who undertakes research in a new field, and must search for his material among the ancient records and in the books of scattered libraries. The provision of the apparatus renders the path of the child's development direct, instead of haphazard and tortuous. And in this way much time and vital energy is conserved, reinvigorating the child's life, and animating his activities in further conquests. "Prepare ye the way of the Lord, and make his paths straight."

Relation of Senses to Environment. Another important aspect of this material for training the senses is the relation which it bears to the child's external environment. It will be noted that it represents in a concrete and isolated form the various qualities of color, dimension, shape, and so on, of the objects which surround the child in his environment. The colors, for instance, which figure in his surroundings in every imaginable combination with qualities of texture, form, dimension and the like, are each represented in the color tablets, in isolation from others, and confined to a single object of which they are the one characteristic. Forms are separated in the same way. The shapes which surround the child everywhere—the rectangle of the door, the circle of his plate, the ellipse of the table—are all represented in his geometric insets. Similarly other qualities, such as high and low, long and short, thick and thin,

are exemplified in the cylinders, the rods and the prisms. Rough and smooth, light and heavy, loud and soft, are all experiences encountered in his use of the apparatus.

The apparatus therefore represents an analysis of the environment, and the child's use of it serves in a sense as an explanation, or kind of "introduction" to it, unconsciously establishing an order of clear ideas in his mind, which leads to his observation of his surroundings in an orderly and intelligent way. As the child, in fact, distinguishes the different sense impressions in his exercises, the teacher fixes the new idea in each case with a word, teaching him the names of the qualities he has perceived. For instance, choosing an opportune moment, she takes two of the color spools with which the child has become familiar in the exercise of pairing the colors, say a red and a blue one, and laying them before the child, she holds them up, attracting his attention to them in turn, and saying simply, "This is blue," "This is red." She emphasizes the words *red* or *blue,* or repeats them, to fix them well in the child's mind. After a pause, wishing to test if he has understood, she says, "Give me the red," "Give me the blue," and if the child responds correctly, she proceeds to the third period of the lesson, asking "What is this?" "Blue." "And this?" "Red."

The three periods we have described are characteristic of the lessons given in a Montessori school, and a similar proceeding is followed in all the cases of lessons in nomenclature. They originated with Seguin.

In this way the child learns a large number of general names in their precise meaning, referring to the qualities of objects in his environment; large, small; high, low; light, dark; round, square, oblong; rough, smooth; and so on. Generalization, however, or the recognition of these in his surroundings, is a further step, and with normal children generally comes spontaneously. Some children will immediately pass from the particular to the general. For instance, having done the exercise in feeling the qualities of different stuffs, they will at once seek similar experiences about them. A visitor, in fact, is often surprised by the approach of a child who lightly takes hold of the stuff of her dress, feeling it between his fingers with evident pleasure. Other children will not generalize at once, but in general the teacher awaits the spontaneous appearance of this phenomenon. A child, for instance, will suddenly become aware of one of these applications in his environment. The sky is blue; the window is a rectangle; and these little discoveries come as a surprise to him. He feels a joy akin to that of real discoverers, and this prompts him to further observation of his surroundings. The children with senses already educated become spontaneous observers, and the discoveries which they make fill them with enthusiasm. A child was once seen gazing for a long time at the new moon. He was then heard to remark, "It is part of a circle. No. It is part of an ellipse!" The observations which they make come in the nature of recognitions, entering the mind like old friends, instead of unknown strangers; and they take their place in a classification already existing, each under its appropriate name. The children thus observe with order instead of chaotically, and an important foundation is therefore laid in the orderly construction of their mental processes.

The Lesson of Silence. A game in which the children take much delight, and which, from many points of view, plays an important part in their education, is the "Lesson of Silence." Choosing an opportune moment in the day, the teacher invites them to remain perfectly still, establishing a profound silence in the room. The room is then darkened, or the children close their eyes, and the teacher, going into a far corner, or perhaps into an adjoining room, calls the children, one by one, by name, in a hardly audible whisper. The child whose name is called has to rise quietly and make his way, with the least possible noise, to the voice which has called him. Little by little a small group of children forms round the teacher. These stand silently watching their motionless companions, who, one by one, "awaken," open their eyes, and trip softly towards the little group in response to the light whisper of the teacher's voice.

When the silence is established, many noises, before inaudible, become apparent; the rustling of the trees in the garden, the hum of a bee, the ticking of the clock; and these fascinate the children, causing them to deepen and perfect the silence. The children, in fact, take a deep joy in this experience, which is like a restful retreat from the habitual noises which surround them.

To listen to these almost imperceptible sounds and await with keen attention the hardly audible whisper of the teacher's voice, is an exercise of the hearing which plays a valuable part in the education of this sense. The efforts for self-control needed to maintain the silence are also of the greatest value. The children have

to restrain impulses to move, and they sometimes succeed in this in spite of the strongest stimuli. A child, for instance, is seen to repress a sneeze, or refrain from brushing a fly from his face.

The children feel the action of a collectivity in this game. The child, with his eyes closed, hears the sound of another's movement, and it is brought home to him in the most striking way that the silence depends upon the coöperation of *all* the children, causing him to increase his own efforts to remain motionless.

The children who have learned to enjoy the pleasures of silence become sensitive to harsh and unpleasant noises; and also, during the hours of work, try to prevent these, moving carefully to avoid knocking against the furniture, and thus adding to the grace of their movements. The repetition of the "Lesson of Silence," in fact, is found to have a marked influence upon the "discipline" of the children in the "Children's House." The mother of several children might well find a similar exercise helpful occasionally in the home.

Writing and Reading

In the teaching of writing and reading, Dr. Montessori perhaps achieves one of the most striking successes of her method. The children, in this method, *prepare* themselves for writing without actually writing. The different processes involved in writing are analyzed and prepared *separately,* leading concurrently to a certain maturity, when the child is able to write whole words or even sentences, although writing for the first time. This comes about without effort, and is rather a source of pleasure, and, when they finally write, of intense fascination to the children.

During the period of sense training and exercises in practical life, the children do an exercise which consists in filling in outline designs with colored chalk. These they draw on paper with the help of metal insets (similar to the geometric insets of wood), which they use as stencils. They then fill in the figure drawn with light, parallel lines. The exercise is followed by more difficult ones, requiring the use of printed designs of gradually-increasing complication. This exercise, which is very fascinating to the children, enables them to gain control of the pencil, and therefore forms a fundamental part of the preparation for writing.

Writing, however, involves another and more particular process, which consists in tracing the forms of the letters. Preparation for this is given by means of the "sandpaper letters," which consist of large letters of the alphabet (script) cut out in sandpaper and gummed on to smooth cards. The object of these is to enable the child to pass his finger tips lightly over the letters in the sense of writing; his movements are guided by the sandpaper, which furnishes a contrast with the smooth surface of the card. The teacher presents the cards to the child, two at a time, teaching him the phonetic sounds which they represent. At the same time she has the child "touch" the letters with the tips of the first two fingers of his right hand, directing him to pass them over the letter in the sense of writing. Children who have followed the method up to this point have already done exercises in touching rough and smooth surfaces, and in passing their fingers around the contours of geometric figures. The exercise, therefore, presents no new difficulties to them, and is found to prove an attractive one, which they repeat with pleasure. Children from four to five years of age take especial delight in this exercise, after which period it is unusual to find in them the same persistency. It is the repetition of the "touching," in fact, which has importance, fixing the form of the letter not only in the child's visual memory, but also in his muscular memory, and coördinating the movements made in tracing it.

Having thus learned the sounds of the letters, the child begins to compose words with the "movable alphabet." This consists of letters of the alphabet cut out of thin cardboard, and kept in two cardboard boxes containing many copies of the same letter. The teacher pronounces some word slowly and distinctly, and the child, whose ear has already been educated, is able—by repeating it continually to himself—to analyze its sounds and pick the corresponding letters out of the box. These he arranges in order upon his table or mat upon the floor, performing an operation similar to that of a compositor. The children ask the teacher to suggest other words, or they themselves think of words to write, or are given them by their companions.

The child who has thus learned to compose words and sentences, and has at the same time prepared his hand in the processes involved in writing, arrives one day at the point of being able to write; and this comes as a great and

joyous discovery for him. In a tolerably clear hand he will trace whole words or sentences, although this is the first time he is holding an instrument in his hand for the purpose of writing. And from that time on he proceeds with passionate delight to increase and perfect his new acquisition.

The beginning of reading, in contrast with other methods, comes, not before writing, but contemporaneously with it, since the child is naturally able to read the words which he has composed. But the reading of words not previously written is a further step, and is practiced by giving the children slips of paper upon which are written words, or, at a more advanced stage, sentences, describing actions which they must carry out. Of course care must be taken to use only familiar words.

Number Work

The child's first ideas of number are given by means of an apparatus with which he is already familiar; namely, the rods, or "long stair." These he has already learned to place in order of length. The rods, of which there are ten, vary in length by intervals of one decimeter, from one meter to a decimeter. The decimeter lengths composing them are painted red and blue alternately. The shortest rod thus consists of one decimeter length, the next of two such divisions (painted red and blue), the next of three, and so on. With these the child learns the numbers up to ten, being taught them, as with the letters, by the three periods of Seguin.

The teacher then introduces the child to the numerals, which are cut out in sandpaper and gummed upon smooth cards, in the same way as the letters. In connecting these with the names of the numbers which they represent, she has him "touch" them, thus preparing him simultaneously to write them; and also associates them with the rods to which they correspond, showing him how to place each numeral against its appropriate rod.

The child then constructs the "long stair," placing the cards in order against the successive "steps."

This game is followed by another in which little sticks, or pegs, are placed in a row of numbered compartments. There are ten compartments labeled from 0 to 9, and the child must place the correct number of sticks in each compartment. This game teaches the meaning of the zero, since *nothing* has to be placed in the compartment labeled 0.

Addition and subtraction may also be begun with the rods, the child placing the 1 end to end with the 9, and writing $1 + 9 = 10$. He then adds the two to the eight and writes $8 + 2 = 10$. Then $7 + 3 = 10$, and so on. The reverse process naturally constitutes subtraction. On reaching the five, he may be shown that in *turning it over* it makes up the ten; and the child writes $5 \times 2 = 10$. Extensions and variations of such processes suggest themselves.

For counting up to 100, two cards are provided on which are printed in a column these figures. By covering the 0 with cards bearing the numerals, the child can compose 11, 12, 13, etc., and similarly 21, 22, and so on, up to 99. Arrived at this, the children themselves ask, "But what comes after 99?" and the teacher then teaches them the 100.

10
20
30
40
..
..
up to 90

Musical Education

An important exercise which greatly helps the children in gaining equilibrium and grace in walking consists in marching upon a narrow line painted upon the floor. They do this first as a simple exercise in balancing, but it is later combined with music, a simple march being played to accompany them. At first, however, the children make no effort to march in time to the music. This shows lack of *perception* of the rhythm, and the teacher makes no attempt, by clapping her hands or other means, to have the children do so. It is an education of ear which is needed. Instead, she continually *repeats* the same tune; the children one day of themselves become aware of the rhythm and begin to march in time. To move in time to a rhythm which is felt is a primordial instinct, and this point attained, other tunes may be added. The children, in fact, are shortly able to change their action, running, walking softly, or galloping in accordance with changes of the music, without a word at any stage from the teacher. They often accompany their marching with little songs, clap their hands, or beat toy tambourines, etc., in time to the music. The teacher may then also introduce dancing,

showing the children some simple steps which may gradually be made more elaborate.

The older children take interest in a double series of bells, mounted upon wooden stands. These are all similar in appearance, but on being struck, emit the notes of the musical scale. One series is placed in order upon a board, and the others stood in a mixed group upon the table. The child strikes the first bell, "do," of the fixed series, and then searches for its match in the mixed group, striking the bells upon the table in turn. On finding the similar note, he places it opposite the first bell struck upon the board. He then proceeds to the next, finding its pair and placing it opposite its fellow, and so on, until every tone in the scale has been matched up.

This is primarily a sensory exercise, but it leads naturally to learning the names of the notes, and associating these with the signs of written music. The latter are introduced by means of wooden boards bearing the staff painted in black, upon which a child places disks bearing the names of the notes; this is done (a) with mechanical control, and (b) by memory. These boards also serve for teaching the treble and bass cleff, and for "composing" simple musical phrases. The child, having placed disks upon them representing the air of one of the tunes to which he is accustomed in his marching, may then be led to mark the bars, laying little sticks across the staff; in his marching he has already learned to perceive the *beat* of each bar.

Liberty and Discipline

The processes which have been described, by which the children "educate themselves," may be considered the crux of the Montessori method. It is the obtaining of auto-education which renders the liberty of the child a practical possibility in the school, and it is to this that may be ascribed Dr. Montessori's success where other attempts have failed.

In fact, the discipline in these schools is one of the most striking results of the method. A visitor entering the room will be struck by the harmonious and ordered activity of the children. Here a child is wrestling with an obstinate button on one of the frames for buttoning, another is composing words with the movable alphabet upon a prettily-tinted carpet upon the floor. Another is building the "tower," while others are writing upon large slates, or upon the blackboards hung upon the walls. Children pass lightly to and fro, fetching from the cupboards what material they need, or returning it after use; exchanging remarks with their companions or stopping to admire another's work. The whole atmosphere, in fact, is one of busy and contented activity, each child happily concentrated on the work in hand. Little notice is taken of the teacher, who moves softly from one child to another, giving here a simple demonstration, there a lesson or word of encouragement, or joining enthusiastically in the joy of a child who has made a discovery or succeeded in performing some new feat by himself. The children's activity does not emanate from the teacher, but is the spontaneous self-activity of the children themselves, having origin in the sources of their life. Before this, the teacher is a humble and retiring observer, seeking to help and serve, rather than shape or evoke, the phenomena of life which unfold.

Evidently the idea of discipline which we must hold in regard to a school of this type is very different from that inherent in the old school, in which discipline meant immobility and obedience to the commands of a teacher. In a school in which the children are free, discipline takes on a significance in relation to their *activity*. It is on this, in fact, that the harmonious collective life of the members of the little community rests. An undisciplined child is one whose actions disturb this harmony, or who acts contrary to the generally-accepted standard of good breeding. He is not one who moves, but one who moves improperly. Such actions must be checked by the teacher, and little by little eliminated. But every other manifestation, every action having a good or useful purpose, must not only be permitted, but observed by her.

Such discipline more closely resembles that of adult civilized society, in which liberty is certainly not synonymous with lawlessness and license. Throughout nature, harmony is the result of implicit obedience to law, and the liberty of man does not lie in a license which is antagonistic to life, but in freedom to develop in accordance with the laws which govern his life, and permit of its infinite expansion.

The discipline of the school becomes more nearly perfect with time. Often the first days are ones of great disorder. But, little by little, as the children's interest in work increases, this

confusion gives way to an atmosphere of calm and a self-ordered activity which continually approach perfection, and a spirit of harmony, of mutual interest and of unselfishness gradually arises among the children.

This result can never be brought about by the external commands of a teacher, but is an inner development on the part of the children. Indeed, it seems that just as in adult society, where obedience to law is the rule, and delinquents are nearly all drawn from the diseased or less-favored portions of the community, so the discipline of the child is a natural characteristic of the normal and well-grown personality.

Scientific Aspects. The educational method described will be seen to have its origin in a very different conception of the function of education, and to exert a very different effect upon the individual from that of the former pedagogy. In this method it is the inherent forces of growth and development present in the individual which are the central points of attention. It is to help and nourish these forces, providing them with the stimulus which they need, and leaving them free in their development, that is the central aim. All the particulars of the method revolve about this. The child is no longer looked upon as passive material in the hands of the educator. The old methods spoke of "developing character," "awakening interest," "inculcating the moral sentiments," and the like; the child's mentality was transported indiscriminately, now to mathematics, now to nature study, now to design, as though it were something inert, having no natural activities of its own. These were efforts characteristic of the old education—the determination to mold and fashion the growing individual according to the will of the educator.

In the new method the individual is regarded as a being who contains in himself the forces needed for his development, and who must himself evolve according to his own laws. The function of education is to study and observe these, seeking to correspond to their needs, tenderly nursing, so to speak, the growing life, providing it with the means of growth, the psychic stimuli which it needs, and waiting and observing. In determining the action of pedagogy, so understood, Dr. Montessori considers that the help of science is needed. It is science which must study the growing life, determining its needs and the help which may be given it, just as science determines the action of the modern gardener, defining the conditions of soil and temperature which he must supply, his intervention, etc.; but he must also wait for the plant to appear, since it is life, and not the scientific conditions, which brings it into being.

Hygiene has already done this work for the physical life, but science must extend its action, Dr. Montessori declares, to the psychic life. It is a contribution, in fact, of this kind, which she considers to be made by her method. It is science which has established the means of education herein used, proceeding by objective study and by experiment to determine the means and action of education in its nurture of the growing life, which leads to its unfolding in the fullest and most perfect way. This is the function of education—to secure the generous unfolding of life; to follow it in its development according to its own laws, seeking to correspond to its requirements, in order to insure the fulfilment of its inherent powers.

The freeing of the child's spirit must be the first condition of such pedagogical action; and for this reason the continual class instruction of the teacher can no longer have place. The practical solution, in fact, of the problem of liberty in the school lies in the didactic apparatus, which enables each child to expand his own energies, finding the outlet which he needs for his muscular and mental activities.

The activity of the teacher must be to put the child into communication with this material, setting him upon the path of his development, but then retiring before his spontaneous self-activity for which she can do nothing. Her aim is to follow this life which unfolds, providing it with its needs, giving the stimulus which starts a spontaneous work of expansion; but she must also know when to retire, to perceive the moment in which her interference will hinder; to wait and to observe. She must have infinite faith to await the gifts of life; they will come. And this faith increases with experience. She will also know that any action which can help this unfolding must of necessity be limited. Hers to give the touch, the light cast upon the path; Life's to unfold the great miracle of human activity and expansion.

The intervention of the teacher, in fact, is limited by science. It is found from experiment that too much interference on her part hinders the child in his development, while too little likewise retards it. Within limits, therefore, her activity may be exactly defined. The

words of the lessons, for instance, are precisely determined, the reactions of the children which she must respect are already known. But this can never render her work mechanical. Each case will have different needs; and her action must rather be guided by a fine intuition and delicate sensibility, which raise it to the level of an art. She is the skilled and watchful attendant upon Life, serving it devotedly in its entry into the world. And the refinement of her sensibility in observation and interpretation of the child, which forms part of the perfection of her moral beauty, raises her in dignity to that of priestess of humanity, enabling her to lay priceless gifts upon the altar of the new generations.

The didactic apparatus also owes its origin to scientific study and experiment. It corresponds to facts of the child's nature, and, as with all natural facts, it is positive science which puts us in touch with them. The articles composing it must correspond in *nature* to the child's innate needs and tendencies, and they must also be attractive to him in *form*. The Montessori didactic apparatus represents a selection from a vast number of experiments, objects having been retained or rejected, and modifications made according to the activity of the child in regard to them. The phenomenon of fundamental importance is a profound interest and concentration of attention on the part of the child towards one of these articles. This first arrested Dr. Montessori's attention in the case of the cylinders during her first experiments with normal children—a child, with fixed attention, repeating the exercise an innumerable number of times. By repeated trials, she was able, little by little, to extend this phenomenon to all the other objects of her apparatus, every detail of form, dimension and color being determined in reference to this criterion. Seguin had invented material by which the education of deficients was *possible*. Montessori, coming later, found that many of the same devices, in identical, or modified form, led to *auto-education* when placed in the hands of normal children.

The apparatus is an *aid* to the child in his development, and may be considered, along with the help of the teacher, and the other provisions of his environment, as constituting the *psychic* nourishment of his growing life.

An important characteristic which experience must consider in regard to this apparatus is its quantity. At first sight it would appear that to multiply it indefinitely would be the best means of serving the child; but in reality a limited quantity is found to give the best results. The apparatus must be *sufficient* for its purpose, but not excessive. The child's development is not in exact correspondence with his exercise with the apparatus, but consists also in a spontaneous work of generalization and of abstraction. The child, for instance, generalizes from the apparatus for sense training to his environment. But experience shows that too great a quantity of material retards this spontaneous generalization, the child remaining torpidly fixed upon the material objects. Similarly a smaller quantity of apparatus is insufficient to lead the child to this point; we see this exemplified in the difficulty which the teacher in the common schools experiences in leading the children to make this generalization.

The same holds true for the apparatus for number. At a certain stage the child abstracts, making arithmetical calculations in his head instead of using the material objects. Too great a multiplication of these, however, distracts his attention from this progress, and he forgets the spontaneous abstraction which was born in him.

The child passes from the frames to dressing in reality; and from touching the sandpaper letters to the infinite applications of writing. Thus the apparatus is not an end, but a means, whose function is to bring about an infinite activity and expansion. Its purpose is to produce this as quickly and as completely as possible, and one of the conditions which it must fulfil to this end is its limitation.

Observing the Child. A method of education which seeks to leave the child free, corresponding to his needs, permits also of his observation from a new point of view. His real nature is revealed to us, in which science may disclose absolute laws. Dr. Montessori, in fact, rather than claiming to have established a new method of education, claims to have established the method for a new science; since the child may be scientifically observed under conditions of freedom in which he is able to attain the normal fulfilment of his life.

This is essential to the construction of a true infant psychology. Just as infant physiology was really known only after the positive sciences had revealed the laws of hygiene, and sprang up as a positive science almost side by side with hygiene itself, so infant psychology will be known only when we can make positive studies of the child under conditions for the

psychic development similar to those of hygiene for the physical. Psychology and pedagogy thus go together in the "Children's House;" their methods are identical. From one point of view the methods employed are educational, from another they furnish the conditions required for scientific research. The *school* thus becomes the field of experimental psychology, and the teacher a scientific observer.

In conclusion we may cite the observations and records which it is the duty of the teacher to make. A biographical chart is constructed for each child, recording the more important facts of his physical and psychological development. Psychological observations, of course, are of a synthetic nature; that is, they have reference to manifestations of the child's personality as a whole, and this gives rise to a classification of psychological characteristics fundamentally different from that of the modern experimental laboratory, in which the trend of investigation is analytical rather than synthetic. The guide with which Dr. Montessori supplies the teacher for her psychological observations is as follows:

Guide for the Psychological Observations

WORK

Note when the child begins to remain constantly at work.

What work and how long he persists in it (slowness in bringing it to an end, or repetition of the same exercise).

Individual peculiarities in application to the different occupations.

To what work he applies himself successively in the same day and with what constancy.

If he has periods of spontaneous diligence and for how many days.

How he manifests his need to progress.

What occupations he chooses in their progression, remaining at them with persistence.

Persistence in spite of stimuli in the environment which would tend to distract his attention.

If after an enforced distraction he returns to the work which was interrupted.

CONDUCT

Note the state of order or disorder in the acts of the child.

His disordered acts.

Note if there are changes of conduct during the development of the phenomena of work.

Note whether, in the establishing of order in his acts, there are:

Crises of joy,

States of serenity,

Manifestations of affection.

Interest which the children take in the development of their companions.

OBEDIENCE

Note whether the child responds to invitations when he is called.

Note whether, and when, the child begins to join in the work of others with intelligent effort.

Note the establishment of obedience to requests.

Note the establishment of obedience to commands.

Note when the child manifests obedience.

Note the relations between the various phenomena of obedience in its grades—

(a) With the development of work.

(b) With changes of conduct.

Observations on Physical Development

The record of the child's physical development takes the following form.

Weight (weekly).

Height—standing and sitting (monthly).

Head—circumference, maximum anterior-posterior and transverse diameters (yearly).

Thoracic perimeter (yearly).

From these are calculated and recorded—

(1) The Ponderal Index

$$\frac{\text{Weight} \times 100}{\text{Height standing.}}$$

(2) The Index of Stature

$$\frac{\text{Height sitting} \times 100}{\text{Height standing.}}$$

(3) The Cephalic Index

$$\frac{\text{Transverse diameter of head} \times 100}{\text{Anterior-posterior diameter.}}$$

The measurements are taken on the day of the week, month or year on which the child was born, so that the teacher has only a small group of children to measure daily.

They are recorded on printed forms, separate copies of which are provided for each child. Groups of related facts are kept upon separate sheets for ready reference, or for regrouping in the case of future research.

In addition to a record of the child's development during his school life, account is also taken of his past history. Inquiry is made as to the age at which the teeth were cut, and at which the child walked and spoke; any illnesses which he may have had; facts relative to his birth (normal or otherwise); age at which his parents contracted marriage, their illnesses, etc. His home environment also has an important influence upon his life, and particulars are gathered as to the wealth, social position and habits of the family.

These particulars may be elicited little by little by the teacher in her intercourse with the child's parents; her opportunities are exceptionally good in this respect in the case of the "schools within the home," in which she lives in the same block of dwellings as those from which the children are drawn.

The importance which such a body of facts would have in the scientific world, should their collection be made upon a large scale, can hardly be overestimated. Almost every branch

of modern science dealing with the different aspects of man's life would derive from it direct or indirect data or assistance. Medicine, for instance, should find valuable help in diagnosis from the biographical chart; while the results upon the children of the method itself, in calming them, revealing almost a new child nature as regards mental characteristics, should be of great interest to the specialist in children's diseases and nervous ailments.

For psychology, a new field of research is opened which should bear rich fruit, especially in the sphere of psychogenesis. From the social inquiries, too, much might be expected, criminality, jurisprudence and political science today tending to find new foundations in the social conditions of the home, and the biological history of the individual. The new science of eugenics also derives data from such inquiry. The new field of study, in fact, which this method opens up, fills a void in our knowledge of man and the laws of his life, which must have the widest relationships with the other aspects under which he is studied; and perhaps, in its development, it may even be found to shed illumination upon some of the difficult, disputed questions of morality and religion. M.M.

Henry N. Holmes, in his introduction to Madame Montessori's book, writes as follows:

> Dr. Montessori's views of childhood are in some respects identical with those of Froebel, although in general decidedly more radical. Both defend the child's right to be active, to explore his environment and develop his own inner resources through every form of investigation and creative effort. . . . . In the practical interpretation of the principal, however, there is decided divergence between the Montessori school and the kindergarten. The Montessori "directress" does not teach children in groups, with the practical requirement, no matter how well "mediated," that each member of the group shall join in the exercise. The Montessori pupil does about as he pleases, so long as he does not do any harm.

Consult George's *The Montessori Method,* a translation of one of Madame Montessori's books: Boyd's *From Locke to Montessori: A Critical Account of the Montessori Point of View;* Ward's *Maria Montessori and the American School;* Fisher's *The Montessori Manual.*

MONTEVIDEO, *mon te vid' e o,* known officially as San Felipe y Santiago de Montevideo, is the capital and principal seaport of Uruguay. It is 120 miles east-southeast from Buenos Aires, and faces the broad arm of the sea known as the Rio de la Plata. The shortened name of the city is a Latin phrase meaning *I view from the mountain,* and is pronounced regularly as indicated above. The residents of the city, and travelers very generally, pronounce it in Spanish fashion, accenting the syllable next to the last. The city was founded in 1726, though the Portuguese had established there a small fortress in 1717. From an ancient inscription (discovered in 1827) the site would seem to have been visited three centuries before Christ by Ptolemy, an officer of Alexander the Great (see Uruguay). The population in 1915 was 364,185.

Montevideo is generally laid out in rectangular squares, with well-paved streets, and is one of the world's cleanest cities. With its equable climate it is a favorite resort for tourists in that part of the world; the city government has recently purchased the elegant Hotel Parque, to be maintained through all seasons. The city is built chiefly of brick or of rough stone, covered with plaster. The great cathedral (consecrated as such in 1869) was begun as a parish church in 1804. The ancient *cabildo* is now the statehouse. The dwellings generally have flat roofs, with observation towers. There are more than forty charitable institutions, a national museum and a public library (founded, respectively, in 1833 and 1835), a British hospital, for sailors especially, an Italian hospital, the university, institutions for the insane, etc. Playa Ramirez and Pocitos, to the east, are popular bathing places. The harbor is naturally a rather shallow bay, nearly circular in shape, with an opening of about two and one-half miles. Breakwaters have been supplied for the outer harbor, and the entrance channel has been so dredged as to admit the largest steamships. A great embankment on the shore line, dry docks and the terminals of four railways are among the features of the city. J.S.C.

MONTEZUMA, *mon te zoo' ma* (about 1479-1520), the last ruler of the Aztecs of Mexico, whose fame is due to his conflicts with the Spanish conqueror Hernando Cortez (which see). Montezuma had been ruling in Mexico City (then called Tenochtitlan) for seventeen years when the news was brought to him of the invasion of the Spaniards. Unable to prevent their entering his city, he afterwards proved himself so weak and vacillating that in a short time the foreign visitors had securely established themselves. Montezuma allowed himself to be kept a prisoner, and when the Aztecs could no longer tolerate the overbearing conduct of the Spaniards they called upon the emperor's brother to lead them in a revolt. While this rebellion was in progress Montezuma died. Some authorities say the Spaniards killed him. The invaders themselves gave out

the story that he was slain by a stone hurled by one of the revolters, while he was attempting to quiet them from the roof of the palace. See MEXICO, subtitle *Government and History.*

MONTEZUMA

Illustration drawn from an old copperplate engraving.

MONT'FORT, SIMON DE, Earl of Leicester (about 1208-1265), a famous English statesman and soldier, prominent in the development of the British Constitution. He was born in France, but went to England in 1230 and soon found favor with Henry III, who restored to him the lands which had once belonged to his grandmother. In 1238 he was married to the king's sister, Eleanor, and two years later went on a crusade to the Holy Land.

As governor of Gascony from 1248 to 1252, he incurred the disfavor of Henry, and although a formal reconciliation was effected, he became the leader of the barons in their protests against the king's unjust and exorbitant demands. The king was compelled, in 1258, to respect the claims of the people and the provision of the Magna Charta, but he soon withdrew his assent, and the barons, with Montfort at their head, took up arms. They defeated Henry at Lewes in 1264, and by the treaty which they forced from him Montfort became the real ruler of the kingdom. To the Parliament which he summoned in 1265 he admitted representatives of the people, and thus instituted the House of Commons. Later in the same year there was a battle at Evesham between the royalist forces and the barons, in which Montfort was killed.

MONTGOMERY, *mont gum'er i,* ALA., the capital of the state and the county seat of Montgomery County, is about fifty miles southeast of the geographical center of the state, at the head of navigation on the Alabama River. Birmingham is 100 miles northwest, Atlanta is 175 miles northeast, and New Orleans is 320 miles southwest. The city is an important gateway of the South, having unusually good transportation facilities through the Louisville & Nashville, the Central of Georgia, the Mobile & Ohio, the Western of Alabama, the Atlantic Coast Line and the Seaboard Air Line. Steamers operate from Mobile to Montgomery, a distance of 400 miles, except during periods of excessive drought. In 1910 the population was 38,136; in 1916 it was 43,285 (Federal estimate), less than five per cent being foreign born. The area is nearly seven square miles.

Montgomery is located on a high, red-clay bluff which rises from the river, in the midst of a rolling, picturesque country. Though its large, old-fashioned homes, with spacious grounds and an abundance of semitropical foliage throughout the year, give it the appearance of a city of the Old South, it is keeping pace with the industrial and commercial growth of the New South. The business district lies in the valley, and the residence section is on the hills.

Buildings and Institutions. The imposing state Capitol is the most notable of the city's structures; the central building is the old Capitol of the Confederate government, and the Department of Archives and History is in the north wing. The museum and Art Gallery and the Confederate Monument are of especial interest. Estelle Hall, the courthouse and city hall, Masonic Temple, Carnegie Library, Sidney Lanier high school, the new union station, which cost $250,000, the Federal building, which cost $112,000 in 1885, are also conspicuous buildings. Montgomery has the Woman's College of Alabama, a normal school for negroes and two business schools. The city has five hospitals.

Commerce and Industry. Montgomery lies in the famous "Black Belt," a band of rich, dark soil, which produces an abundance of cotton, grain, fruit, vegetables, timber and live stock. The city is the great central market for this region, and a foremost trucking center for the supply of vegetables to Northern markets. It is one of the chief cotton-shipping cities of the South. Coal and iron-ore are found in the vicinity. In the list of industrial plants cotton mills, cottonseed oil mills and fertilizer plants are most important. There are over fifty wholesale houses and more than 100 manufacturing plants, besides railroad repair shops.

History. Andrew Dexter was the founder of the city. It was the site of the legendary Indian village called *Ecunchatty,* and Dexter named it New Philadelphia. In 1819 it was consolidated with East Alabama Town as Montgomery, named in honor of General Richard C. Montgomery, of Revolutionary War fame. It was incorporated in 1837 and supplanted Tuscaloosa as the state capital in 1847. In 1849 the Capitol was destroyed by fire and was replaced by the present one in 1851. The city's interests and large colored population made it the focus of the secession movement. It became the first capital of the Southern Confederacy, and for this reason was called *The Cradle of the Confederacy;* here Jefferson Davis was inaugurated as President. In 1910 the city adopted the commission form of government. B.K.

MONTH, *munth,* a period of time measured by the motion of the moon. The word originally meant the time during which the moon makes a complete revolution, but as that might be a revolution with reference to one of several heavenly bodies, special names are applied to the different periods. Thus, the revolution of the moon from perigee to perigee (see PERIGEE) is called the *anomalistic month;* it has an average length of 27 days, 13 hours, 18 minutes, 37.4 seconds. The *sidereal month* is the period during which the moon, if viewed from a fixed star, would seem to make a complete revolution around the earth; this month is 27 days, 7 hours, 43 minutes, 11.5 seconds. The *proper lunar month,* often called the *synodical month,* is the period from one new moon to the next, an average of 29 days, 12 hours, 44 minutes, 2.7 seconds. The synodical month is one of the three natural divisions of time, the other two being the revolution of the earth on its own axis and its revolution around the sun. Another astronomical month is the *solar month,* a twelfth part of the solar year. The solar month, in other words, is the time taken by the sun to pass through one of the signs of the zodiac.

A calendar month is one of the twelve parts into which the year is divided. In order that twelve calendar months might equal twelve synodical, or true, months, the calendar months were originally reckoned as 29 and 30 days, alternately. This rough approximation was superseded by other attempts to secure a proper relation between the lunar, solar and calendar months. The calendar month now varies from 28 to 31 days (see article on each month).

Days of the Month. In the Gregorian calendar each day of the month is known by a number, as the first, or the second, or the twentieth. This has not always been the case. The ancient Greeks divided the month into three periods of ten days, and the French Revolutionary calendar, in which all the months were of equal length, used the same system; thus the 15th day of the month was called the fifth day of the second decade. The Romans used an even more complicated system. The Roman calendar had three fixed days in each month, the *calends,* the *nones* and the *ides.* From these fixed days the Romans counted backward. The calends were invariably the first day of the month; the ides were at the middle, either the 13th or the 15th day; and the nones were the ninth day before the ides, both days being counted. Thus is explained the definiteness of the warning to Julius Caesar to "beware the ides of March." The days between the calends and the nones were called *the days before the nones;* those between the nones and the ides, *the days before the ides;* those between the ides and the calends, *the days before the calends* of the following month. Thus the last day of February would be called *the day before the calends of March* (see CALENDAR). W.F.Z.

MONTICELLO, *mon ti sel' o,* the home of Thomas Jefferson (which see).

MONTMAGNY, *mawN' ma' nye,* the county town of Montmagny County, Quebec. It is on the south bank of the Saint Lawrence River and on the Intercolonial Railway, thirty-six miles east of Levis, which is opposite Quebec, on the Saint Lawrence. Montmagny has important lumbering interests, and among its industrial establishments are lumber, saw and planing mills, a pulp mill, sash and door factory and a wagon factory. There are also several foundries, shell factories, gristmills and butter factories. The town has the county

courthouse and jail, a registry office, customs-house, a convent school and an asylum for old people. The city hall is also a prominent structure. The town was founded about 1700, and was incorporated in 1883. Population in 1911, 2,617; in 1916, about 3,000. A.J.B.

MONTMORENCY, a distinguished family of France which has been prominent in historic affairs since the twelfth century. MATTHIEU II (1189-1230) was the first to win fame; he held a position of great power under Philip Augustus and his successor. ANNE DE MONTMORENCY (1493-1567), the first to bear the title of Duke, was one of the most illustrious of the line, serving ably both in war and in peace under Francis I and under Henry II. He was killed in battle against the Huguenots.

The grandson of the first duke was HENRY DE MONTMORENCY (1595-1632), who bore the titles of Admiral of France and Viceroy of Canada. Like his grandfather, he won victories over the Huguenots, and also defeated the Spaniards in a sharp battle, but he won the enmity of Richelieu, was accused of treason, and on October 30, 1632, was put to death.

Two members of this family, the Duke of Montmorency-Laval (1766-1826) and his father, served in the Revolutionary War in America, and the son later took a prominent part in the French Revolution.

MONTMORENCY, *mont mo ren' si,* **RIVER,** a short, swift stream which flows into the Saint Lawrence six miles below the city of Quebec. At its mouth are the famous Montmorency Falls, 150 feet wide and 265 feet high, about 100 feet higher than Niagara. A visit to the falls is one of the most attractive side trips from Quebec, and is made by thousands of tourists each year. The power obtained from the falls is of great importance to the city of Quebec. The river has its source in Snow Lake, about forty-five miles northeast of Quebec. It was named for François Xavier de Laval-Montmorency, the first bishop of Quebec.

MONTPELIER, *mont pe' li er,* VT., the capital of the state and the county seat of Washington County, is situated northeast of the geographical center of the state, on the Winooski (Onion) River. Barre is six miles southeast, and Burlington is forty-two miles northwest. The Central Vermont and the Montpelier & Wells River railways serve the city, and an electric line extends to Barre. Although a charter to the land was obtained in 1781, no permanent settlement was made here until 1789. In 1791 the town was organized, in 1805 it was chosen as the capital, in 1855 it became a village and in 1895 it was incorporated as a city. It was named for the French city of the same name. Italians comprise about one-seventh of the population, which in 1910 was 7,856.

Montpelier has a picturesque setting in the midst of some of the most beautiful scenery of a state famous for its verdure-clad mountains. The valley in which it is located is rich in agricultural products, and large shipments of hay, potatoes, dairy products, poultry, granite and lumber are made from this point. Granite works, flour and lumber mills, tanneries, hardware and saddlery works and creameries are the leading industrial establishments. The most notable building is the Capitol, an imposing structure of granite, with a dome 124 feet high, surmounted by a statue representing *Agriculture.* At the entrance, under the portico, are a marble statue of Ethan Allen, an American soldier of Revolutionary fame, and two field pieces from the battlefield of Bennington.

Other buildings worthy of note are the $160,000 Federal building, the city hall, Wood Art Gallery, Kellogg-Hubbard Library, Saint Augustine's church and Heaton Hospital. Besides the public schools the city has Montpelier Seminary (Methodist Episcopal) and the state and public libraries. The Vermont Historical Society, located here, has in its possession the old Daye press on which the first Vermont newspaper was printed. Montpelier was the home of Admiral George Dewey and Rear-Admiral Charles E. Clark. L.A.K.

MONTPELLIER, *mawN pe lya',* a city near the Mediterranean coast of France, noted for its healthful climate, sunny skies and delightful situation in the midst of beautiful gardens, orchards, vineyards and olive groves. It lies about six miles from the shore, on the Lez River, and about seventy-six miles northwest of Marseilles. It is the capital and principal city of the department of Herault, and contains the oldest botanical garden of Europe and a celebrated university, in which Petrarch was a student. The school of medicine was founded by Munich physicians in 1289. A public library containing 30,000 volumes, an art gallery, institutes of science and art, an observatory and a cathedral are points of interest. The important manufactures include woolen and cotton goods, chocolate, chemical products, liquors and perfumes. An active trade is carried on through Cette, its Mediterranean port. Montpellier was the birthplace of the French philosopher Isidore Comte. Population, 1911, 80,230.

MONTREAL, the largest city of Canada, said to have been founded on mysticism and faith, is situated on the island of Montreal in the province of Quebec, at the meeting place of ocean and inland navigation on America's greatest waterway, the Saint Lawrence River and the Great Lakes. Montreal is 164 miles southwest of Quebec, 950 miles from the Atlantic Ocean by way of the Strait of Belle Isle, and 420 miles by rail north of New York. Although Montreal is a thousand miles from the Atlantic, it is 300 miles nearer Liverpool than is New York.

General Description. The island of Montreal is formed by the confluence of the Ottawa and the Saint Lawrence rivers. The island is about thirty miles long and ten miles wide at its widest point. Its most striking feature is Mount Royal, whose summit is 753 feet above sea level and from which the city takes its name. The entire island is covered with farms, towns, villas and the great city, which is located on its southeast side. The site of Montreal rises in a gentle slope from the river to the base of the mountain, on which a part of the city rises in a succession of beautiful terraces.

Sprung from the hope of noble hearts,
Brought into being through sacrifice
Of men and women who played their parts,
And counted not their lives as price,
She has grown in her strength like a Northern Queen
'Neath crown of light and her robe of snow,
And stands in her beauty fair, between
The Royal Mount and the River below.

—McLennan.

The river in front of the city is fully two miles wide. Near the north bank and just without the harbor lies a group of small islands. The largest, Saint Helen's Island, was formerly used as a military post, but it is now a park. Greater Montreal extends along the river front for about nine miles and from four to seven miles back from it. The longest streets follow approximately the direction of the river, but owing to the irregularities of the surface they are not all parallel. The streets extending from the river towards the mountain cross the longer streets at right angles, and, with few exceptions, are parallel. This plan was adopted in 1672 and has been rigidly followed.

The river front is lined with great wharves to accommodate the shipping. Here ample facilities are provided for handling cargoes in the shortest possible time. Freight sheds, huge cranes, railroad tracks, grain elevators and a wilderness of masts and spars form the characteristic features of this part of the city. The wholesale district lies near the river, and beyond this is the retail district with its numerous stores, shops, banks and skyscraper office buildings. Notre Dame, Saint Paul, Saint James, Craig, Saint Catherine, McGill, Bleury, Ontario and Wellington are the principal business streets. Saint Lawrence Street forms the division between the east and west sections and was formerly considered the dividing line between the French and the English parts of the city. Some of these streets near the river are very narrow. Sherbrooke Street and the streets along the mountain side are noted for their fine residences.

Montreal, like Boston, shows in its architecture the transition from the past to the present, from the old to the new. Most of the buildings are modern. They are constructed of gray limestone which is quarried near by. These structures give the city an appearance whose chief characteristics might be expressed as beauty and stability. But in the older part of the city are found now and then quaint structures of an earlier day, some of them dating back nearly two centuries. Between Notre Dame Street and the harbor is the oldest part of the city, and here a number of these quaint old houses may still be seen, the most perfect example being the Hubert-Lacroix House on Saint Jean Baptiste Street. The walls of these old houses are of small boulders cemented to-

gether with an abundance of mortar, and are frequently from two to three feet thick. The stones are often of different colors, giving the building a mottled appearance, not seen in any other style of architecture.

Parks, Monuments and Buildings. Montreal is well supplied with small parks locally called *squares* or, in the French, *places*. At the center of the city's activities is the Place d'Armes, a small square surrounded by noted buildings and ornamented by Hébert's fine bronze statue of Maisonneuve, the founder of the city. Facing this square on the south is the great cathedral of Notre Dame, to the north is the Bank of Montreal, a fine example of Corinthian architecture. The sculpture on the pediment in front is not excelled by any similar work in America. To the east of the Bank of Montreal is the Royal Trust Building, a modern granite structure, and to the west is the post office. Further west on Saint James Street are a number of fine buildings, including the Royal Bank, the Bank of British North America, the Bank of Commerce, Mólson's Bank and the Merchants' Bank.

A few blocks farther east on Notre Dame Street is Jacques Cartier Square, with a monument to Lord Nelson, the hero of Trafalgar. Facing this square on the north are the courthouse and the city hall. Facing the city hall on the opposite side of the street is Château de Ramezay, erected in 1705 by Claude de Ramezay, Governor of Montreal, and occupied by him as a residence. It is now a museum of Canadian historical relics. South of this building and near the river is Bonsecours Market, easily recognized by its great dome. Adjoining the market on the east is a small church, one of the picturesque features of the water-front, an outstanding relic of the past. The foundation and a part of the walls of the present structure date from 1675. One block east and a block north of the market is Place Viger, partially surrounded by a station of the Canadian Pacific Railway, the Place Viger Hotel and the Commercial High School. At the intersection of Saint James and McGill streets is Victoria Square, in the center of which is a beautiful bronze statue of Queen Victoria.

One of the largest and most attractive parks in the heart of the city is Dominion Square, between Windsor and Cathedral streets. The entire park is laid out in walks, lawns and flower beds and is considered by some travelers to be the most beautiful square in the world. Across the street to the southwest is the magnificent Windsor station of the Canadian Pacific Railway. Facing the square from the west are the buildings of the Young Women's Christian Association and the Windsor Hotel, while on the opposite side rises the façade of the great Saint James Cathedral. A bronze statue of Sir John A. Macdonald adorns the north end of the square, and near by is a fine monument to the Strathcona Horse, which served in the Boer War.

Mount Royal Park, with an area of 460 acres, the largest in the city, contains drives, footpaths and numerous shady nooks where one may wander amid trees, shrubbery and flowers. The reservoirs from which the city is supplied with water are located here at an elevation that gives sufficient pressure without the use of pumps. There are two lookouts near the summit from which the observer beholds a broad and varied panorama. At his feet lies the city with its domes and spires. In the distance is a broad and fertile plain, from whose background rise isolated peaks of the Montenegrin Hills—Boucherville, Rougemont and Saint Hilaire—while between, at the edge of the city, flows the Saint Lawrence, changing its hue with the changing skies.

> The river flows in its beauty rare;
> While across the plain eternal rise
> Boucherville, Rougemont and Saint Hilaire.

Lafontaine Park and Saint Louis Square in the eastern part of the city are also favorite resorts.

Churches. Montreal is said to have more large churches than any other city in America. Be this as it may, the churches and other religious institutions are many, and the religious life of the inhabitants dominates the city. Three Roman Catholic churches deserve special mention, and foremost among them is the Cathedral of Notre Dame, facing the Place d'Armes. The building is rectangular, and the architecture is composite Gothic. Two massive towers rise from the front corners to the height of 220 feet, constituting a landmark that can be seen for a long distance in any direction. In the west tower is the largest bell in America, *Le Gros Bourdon,* whose weight is twelve and three-fourths tons. From the top of this tower a fine view of the city and the surrounding country can be obtained. The interior is one vast auditorium with two galleries on each side. It has a seating capacity of 12,000 and can accommodate an audience of 15,000. In its impressive effect and its appointments, Notre Dame more closely approaches the great ca-

thedrals of Europe than any other edifice in the New World.

Saint James Cathedral, facing on Dominion Square, is patterned after Saint Peters in Rome and is one-third the size of that cathedral. It is built in the form of a cross, and from the center a dome, seventy feet in diameter, rises to the height of 210 feet. Rising above the dome is a gilt ball on which is placed a large cross which bears electric lights. The Jesuit Church on Bleury Street is famous for its frescoes.

Among the Protestant churches are Christ Church Cathedral, on Union Avenue, said to be the most perfect church in Canada, architecturally; Saint Andrews, a fine specimen of Gothic architecture; Saint James Methodist; Dominion Square Methodist, and Saint George's, one of the most magnificent Anglican churches, are prominent.

Education. Montreal has two distinct school systems, Roman Catholic and Protestant, with separate boards of commissioners (see QUEBEC [province], subhead *Education*). The various boards raise their own taxes at a rate fixed by the provincial government, on the system prescribed in the article on the province. The instruction under each board is of a high order, and the schools are characterized by thoroughness and efficiency. The Protestant Board of Commissioners maintains a high school for boys, a high school for girls and a commercial and technical high school for both boys and girls. The leading educational institution of the city is McGill University (which see). Laval University of Montreal occupies a position in the Roman Catholic system of schools similar to that occupied by McGill in the Protestant system. The elementary and high schools under each board lead respectively up to these universities. (See LAVAL UNIVERSITY.) The Catholic Board of Commissioners has control of six other colleges and the Jacques Cartier Normal School, widely known for its library of Canadian historical works. These were used by Parkman in preparing his valuable works on American history. There are many theological, medical, law and technical schools in the city and its suburbs.

The most important learned societies are the Natural History Society, which maintains a valuable museum; the Numismatic and Antiquarian Society, which has done much to preserve the identity of the historic sites in the city and which maintains the museum in Château de Ramezay; the Montreal Society for Historical Studies, and a number of societies connected with the universities. There are a number of valuable libraries connected with the educational institutions, the most important being that of McGill University. The public library is far from adequate to the city's needs, but a fine, new building on Lafontaine Park will house an enlarged library. A library much used by the public is that of the Fraser Institute.

Benevolent Institutions. A number of convents maintained by Catholic orders are engaged in benevolent work. One of the largest of these is the Grey Nunnery, which cares for deserted children and the sick and unfortunate of all sects. The city has a number of hospitals, among which the Royal Victoria Hospital is the most important. This was the gift of Lord Strathcona and Lord Mount Stephen and is one of the largest and most completely equipped hospitals on the continent. A large addition has been built by J. K. L. Ross. The other large hospitals are the General Hospital on Dorchester Street, the Western Hospital and the Homeopathic Hospital on McGill College Avenue. Hotel Dieu, a convent, is the largest Roman Catholic hospital. The Notre Dame Hospital is also important.

Commerce and Industry. Montreal is not only the chief commercial center of the province of Quebec, but of the Dominion of Canada, and its commercial rank is due to its location. The canals around the rapids in the Saint Lawrence River and those connecting the Great Lakes enable lake steamers to meet ocean steamers at this point. Montreal is the natural port of exchange between ocean and inland navigation, and, notwithstanding the fact that its port is open only seven months in the year, it handles nearly fifty per cent of the total trade of Canada for this period. The great Canadian railways—the Grand Trunk, the Canadian Pacific—have their headquarters here, and the Intercolonial and Canadian Northern enter the city, as do the New York Central, Central Vermont, and several other lines from the United States.

The Victoria Jubilee Bridge over the Saint Lawrence has a length of one and one-fourth miles between abutments. The first bridge, a tubular structure, was completed in 1860 and was considered to be the eighth architectural wonder of the world. In 1898 this was replaced by a steel arch bridge having tracks for electric cars, driveways and walks, in addition to the railway tracks.

Montreal is favorably situated for cheap power and for obtaining raw materials, and the city is naturally an important manufacturing center. The annual output of the manufactories of the city and its suburbs is about $200,000,000. The leading products include textiles, leather and leather goods, tobacco and tobacco products, iron and steel products, paper and printing, and flour, Montreal having the largest flour mill in Canada.

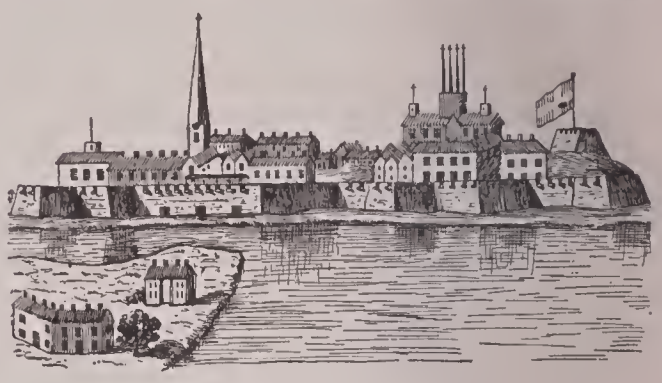
Montreal is a strong financial center, and ranks sixth among the cities of the United States and Canada in its bank clearings.

The People. Montreal was founded by the French, and for many years it was wholly a French city, but as the city gained in commercial importance the English and Scotch entered. Of recent years there has been a very large immigration from Europe, which has made Montreal one of the most cosmopolitan of cities. The Jews (largely Russian and Polish) now number over 50,000, and there are large colonies of Italians, Ruthenians and Russians, with considerable representation of many other races of Southeastern Europe, and a number of Syrians and other Asiatics, including a small colony of Chinese. The French constitute more than half of the total population. Both languages are spoken throughout the city, though French predominates in the east and English in the west. The Jews (speaking mostly Yiddish, but rapidly learning English) have pushed northward from the center of the city; their children practically fill the Protestant schools in this section—the law regards them as Protestants for educational purposes. The bulk of the Ruthenian and allied populations is to be found in the northeast and in Point Saint Charles, westward along the river front. The newer immigrants, especially those of Slavic race, are following northward from the river in the tracks of the Jews. All the immigrants as they mix with the older element become English-speaking; meanwhile a great variety of languages is always heard, and there is a great field for the interpreter. Newspapers are issued in several languages; naturally the majority are in French and English.

History. Referring to Montreal's growth and modern development, a recent writer says:

> The metamorphosis of Montreal is, perhaps, after all the chief miracle of Canada. . . . . It is as if Rome were to clothe herself in the garments of Chicago.

The site of Montreal was first brought to the attention of white men in 1535, when Jacques Cartier (which see) sailed up the Saint Lawrence and discovered the Indian town of Hochelaga at the foot of the mountain. Cartier never returned and the next white visitor was Samuel Champlain (which see), in 1611. Champlain at once recognized the advantage of the place for a trading post and the site of a future city. He named the island in front of the present city Saint Helen's, in honor of his wife, who was the first French woman to come to America.



MONTREAL IN 1760

Two years later he again visited the place to establish a trading post, but his plan was not carried out. The city was founded in 1642 by Paul de Chomedy, Sieur de Maisonneuve, who with Father Vimont and about sixty followers landed on May 18, where the customhouse now stands. An altar was erected and mass was said, during which Father Vimont addressed his little band with these prophetic words:

> You are a grain of mustard seed that shall rise and grow till its branches overshadow the earth. You are few, but your work is the work of God. His smile is upon you and your children shall fill the land.

The settlement was named Ville Marie. The pioneers were exposed to great danger from the Iroquois, and actual colonization did not begin until 1653. Four years later the seminary of Saint Sulspice was founded, and within a few years the Sulpicians became owners of the entire island. The settlement soon became an important post for trading with the Indians. In 1762 the city was laid out, and a few years later the town was surrounded by a palisade. In less than fifty years after the landing of Maisonneuve, Ville Marie had a population of over 2,000 and was an important factor in the affairs of New France. For the next century the growth was slow. By the Treaty of 1763 all Canada passed to the British government. During the war of the Revolution Montreal was visited by commissioners from the colonies, who tried to influence Canada to join them in throwing off British control. Benjamin Frank-

OUTLINE AND QUESTIONS ON MONTREAL

Outline

I. Position and Size

(1) Latitude, 45° 30′ 17″ north
(2) Longitude, 73° 34′ 40″ west
(3) Island location, at confluence of Ottawa and Saint Lawrence rivers
(4) Distance from other large cities
(5) Area
(6) Population

II. Description

(1) Plan of streets
  (a) Longest ones parallel with river
  (b) Principal streets
(2) Wharves
(3) The old and the new in architecture
(4) The parks or squares
  (a) Small parks in heart of city
  (b) Large parks
(5) Notable buildings
    1. Montreal a church city
    2. Cathedral of Notre Dame
    3. Saint James Cathedral
    4. Christ Church Cathedral
    5. Other Protestant churches

III. Institutions

(1) The double system
  (a) Roman Catholic schools
  (b) Protestant schools
(2) Universities
  (a) McGill University
  (b) Laval University
(3) Professional and technical schools
(4) Convents
(5) Hospitals

IV. Commerce and Industry

(1) Chief commercial center of Dominion
(2) Canals
(3) Railways
(4) Value of trade
(5) Manufactures

V. The People

(1) Two dominant nationalities
(2) Two languages spoken
(3) Interesting mingling of customs and styles

VI. History

(1) Early visits to the site
(2) Founding of city
(3) Slow growth
(4) English rule established
(5) Rapid recent growth

Questions

What does the name *Montreal* mean?

Why are no pumps necessary in the water system of the city?

How can this city which is so far inland be nearer England than a coastal city?

What is considered by some visitors the most beautiful square in the world?

What position does Montreal occupy commercially among the cities of the Dominion? Why?

What was considered at the time of its construction the "eighth wonder of the world?"

Why are the longest streets not all parallel?

What is *Le Gros Bourdon,* and what distinction does it possess?

How do the manufactures of Montreal compare in value with those of Boston? Of Philadelphia?

What structure is patterned after one of the most famous buildings in Europe? How does it compare in size with the original?

What is there that is especially interesting about the character of the population?

Of what are many of the picturesque old houses built?

Who was the first French woman who ever came to America? Who founded Montreal? Where is a statue of him to be found?

Why are two distinct school systems necessary?

lin was one of the number, and he brought the first printing outfit to the city. With this a newspaper was established which later became the Montreal *Gazette* and has had a continuous existence to the present day. In 1775-1776 the city was occupied by Continental troops, but the Canadians refused to side with the colonies and the troops withdrew.

From the close of the Revolutionary War to the middle of the nineteenth century the city grew slowly but steadily. Then the turning point in its commercial history came, with the advent of the Grand Trunk Railway and the establishing of the Allan Line of Steamers, the first transatlantic line to enter its port. A ship canal around the rapids was completed in 1849, and in 1860 the completion of the Victoria Bridge gave the Grand Trunk entrance into the city. From that time to the present the city's growth has been steady and substantial. Maisonneuve's little settlement of less than a hundred has become a metropolis with over half a million souls. The population in 1911 was 470,480. In 1915 it was estimated at 570,000, and with the suburbs at 656,500. J.A.D.

Consult Sandham's *Villa Marie: or Sketches of Montreal, Past and Present;* Hinshelwood's *Montreal and Vicinity.*

MONTS, *mawN,* Pierre du Guast, Sieur de (1560-1611), a French explorer and colonizer, remembered as the founder of Acadia. De Monts, who was wealthy and a favorite at court, first appears prominently in 1603, when King Henry IV appointed him governor of the French Company of Canada, with the additional titles of vice-admiral and lieutenant-general. The French Company was given exclusive control of the fur trade between latitudes 40° and 50° north, and also the right to govern the country, which was named Acadia. With Poutrincourt and Champlain as his chief officers, De Monts embarked at Havre, France, on March 7, 1604. The party explored the Bay of Fundy, spent the winter of 1604 to 1605 on a small island at the mouth of the Saint Croix River, and in the summer of 1605 founded Port Royal (now Annapolis). Leaving Poutrincourt behind as governor, De Monts returned to France. There he found that jealousy because of his monopoly and his apparent success had led to the cancellation of his privileges, but he managed to recover a part of them and for several years continued to send out expeditions to Canada. One of these expeditions, led by Samuel Champlain, founded Quebec in 1608. After the death of King Henry IV, in 1610, De Monts was again deprived of all his privileges, and he died a poor man.

MOODIE, *moo'di,* Susanna (1803-1885), a Canadian novelist and poet, famous for her vivid pictures of pioneer life in Canada. Her best-known work is *Roughing It in the Bush.* Others of her books are *Enthusiasm,* a volume of poems; *Life in the Clearings; Mark Hurdlestone, the Gold Worshipper,* her most ambitious novel; *Geoffrey Moncton* and *Dorothy Chance,* both novels. Mrs. Moodie was one of a family of five sisters, all of whom are remembered for their writings. Two of them, Agnes and Elizabeth Strickland, wrote popular histories and historical biographies, and a third, Mrs. Catherine Parr Traill, like Mrs. Moodie, wrote sketches of pioneer life in Canada. With her husband, who was a British officer, Mrs. Moodie emigrated in 1832 from England to Upper Canada. They settled first at Port Hope, but later lived for eight years in the backwoods north of Peterborough. Mrs. Moodie's first attempts at writing were short poems and stories for children, but most of her later work was sketches of Canadian life and fiction.

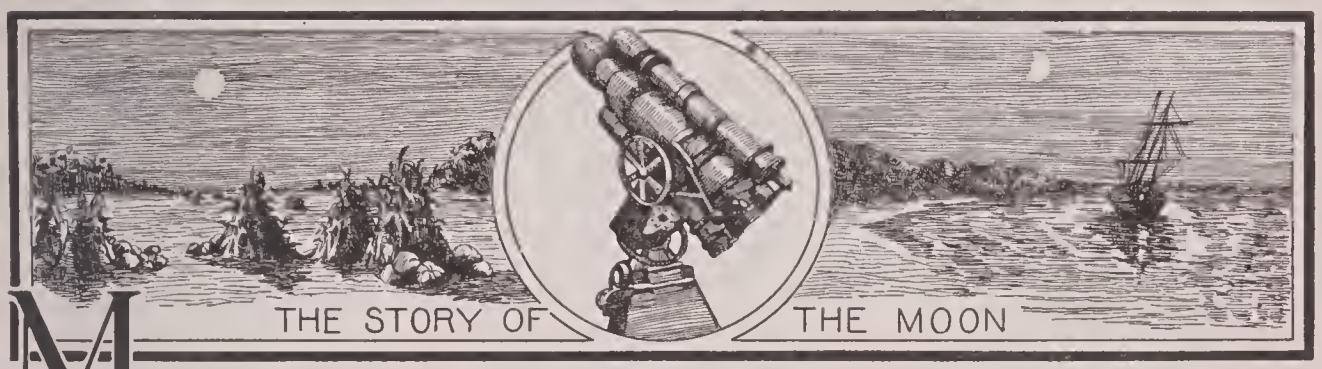
MOODY, *moo'di,* Dwight Lyman (1837-1899), one of the most widely-known of American evangelists. He was born in Northfield, Mass., and for several years was clerk in a shoe store in Boston, leaving that city in 1856 for Chicago, where he entered Christian work and organized a large Sunday School. His work as an evangelist was remarkably successful, and a nonsectarian church was organized, with Moody as its pastor. In the great fire of 1871 its building was burned, but another was built which is still known as the Moody Tabernacle.

Accompanied by the singer, Ira D. Sankey, he visited Europe in 1873, and great religious awakenings were the result of the services they held. He and Sankey also held revival meetings throughout the United States, and Moody founded the Moody Bible Institute in Chicago. His later years were devoted to the upbuilding of a seminary for young women in Northfield, and the Mount Hermon School for Boys at Gill, near that place. He inaugurated the custom of holding summer conferences for Bible study and religious training, also at Northfield. He published *How to Study the Bible, The Way and the Word* and *Secret Power.*

MOODY, William Vaughan (1869-1910), an American poet and dramatist whose early death was a distinct loss to American literature. He produced one play, *The Great Divide,* which

was the sensation of its season, and which is still considered one of the most notable dramas written in America. His lyric work gave him rank, in the judgment of many critics, as the most promising poet of his time. *Gloucester Moors, The Daguerreotype, An Ode in Time of Hesitation* and *Good Friday Night* show the varying phases of his *genius,* and *The Menagerie* is an especially striking discussion of evolution. A second drama, *The Faith-Healer,* is interesting and convincing as a "reading" drama, but on the stage it did not have the success of *The Great Divide.*

Moody was born at Spencer, Ind., was graduated at Harvard, and for a time taught English there and at Radcliffe. In 1895 he became instructor in English at the newly-founded University of Chicago, and six years later he was made assistant professor. Though he was an inspiring teacher, he disliked classroom work; his published *Letters* show how the academic atmosphere irked him.



MOON, the satellite of the earth ordained at the Creation to "light the earth by night." It moves in its own orbit round the earth in 27 days, 7 hours, 43 minutes. From the earliest days of history the moon has been an object of human observation, speculation and attraction. Poets call the moon the "Queen of the Night" and other romantic names; it is popularly recognized as the most attractive and mysterious object in the heavens, and, except the sun, the most dominating.

Formation. It was once considered that the moon was formerly a part of the earth cast off into space, becoming finally a separate planet. The planetesimal hypothesis accounts differently for the creation of the sun, earth and moon (see NEBULAR HYPOTHESIS). The sun became the center of a huge system, with the earth as a satellite, the earth in turn having in the moon a satellite. The moon is of the same formation as the earth but the essence of the composition has been exhausted. Some scientists maintain that the earth is gradually cooling, that in time in almost a countless number of years, the earth will become dead and no life will exist. The surface of the earth will then be like that of the moon, lifeless and cold.

Size, Weight and Distance. It seems incongruous, in view of popular and romantic ideas associated with the moon, to reduce it to measurable size and weight. But modern science takes no heed of legends and traditions and regards the moon as a very natural and unromantic object. The diameter of the moon is 2,163 miles. Its average distance from the earth is 239,000 miles. At night, in some of its changing aspects, the moon appears to be close to the earth, shedding its light in soft, soothing rays, but in reality the distance between moon and earth is much greater than is apparent. An express train traveling at the rate of 60 miles an hour would require 3,992 hours to travel from the earth to the moon; that means a period of perpetual travel at the rate of a mile every minute for 166 days and 8 hours, a total of 23 weeks and 6 days. In volume the moon is 1/49 that of the earth, and to make up the full mass and weight of the earth, 81 moons would be required. The moon's density is 3.4 times that of water, the density of the earth being 5.5.

Atmosphere. The moon possesses no light of its own, and all the heat it obtains it borrows from the sun. There is probably an atmosphere surrounding the moon, but that atmosphere would not support life, as the people of the earth understand life. The temperature on the surface of the moon is estimated at about 200° to 300° below zero for two weeks of every month. For the other two weeks the direct rays of the sun probably raise the temperature near its equator at least as high as that of boiling water. It is apparent that no human being could exist under such conditions. A temperature of a little over 100° F. is trying to all residents in temperate zones, while in the United

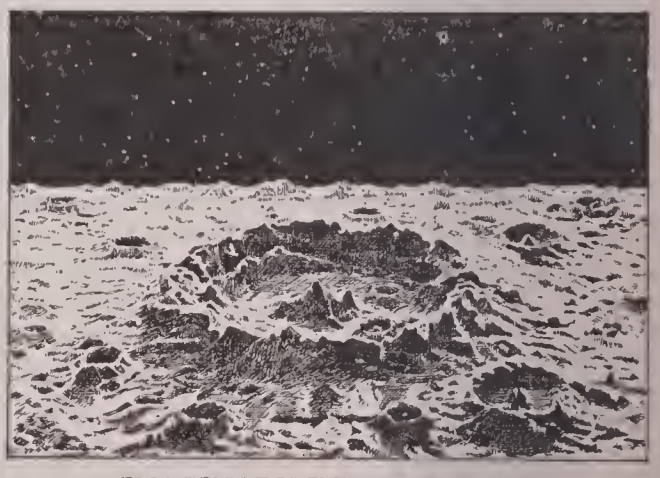
States and Canada a temperature of 50° below zero is considered almost the limit of human endurance. Polar expeditions have failed and brave men have been exhausted and frozen to death at a temperature of 69° below zero. If there is life on the moon, that life, whether human, animal or vegetable, must be different from life on the earth. If water exists on the moon, it must be in the form of ice and if there is any air present it cannot exceed in pressure 1/750 part of the pressure of the earth's atmosphere. The moon is perhaps the most studied object in the heavens; more things can be definitely proved concerning it and its motion than concerning any other planet, but there is not yet built a telescope that can detect any cloud or atmospheric effect on or surrounding it.

Weight on the Moon's Surface. The attraction of the moon is only one-sixth of that of the earth. An apple, or other object, dropped from a height above the earth will travel towards the earth at the rate of 16.08 feet the first second (see FALLING BODIES). If dropped above the surface of the moon it would travel only at the rate of 2⅔ feet the first second. A strong man on earth who can easily lift and raise a 56-pound weight over his head with one hand could perform the same feat on the moon with a weight of 336 pounds. The record high jump of earthly athletes would be broken by the merest amateurs, who in the atmosphere of the moon would be able to jump 20 feet as easily as one on earth can step on or off the street pavement.

Its Light. At the full moon the light reflected by it is just 1/600,000 part of the light of the noonday sun. The surface of the moon, viewed from the earth, appears white, but in reality it is a light gray, in places darkened to the color of seasoned sandstone or slate. The light reflected from it to the earth has passed through two stages, or, perhaps, atmospheres. From the sun to the moon the light travels direct; the light is then deflected towards the earth in volume according to the relative position of earth and moon. The light of the moon is simply modified sunlight which has undergone only such changes as are caused by reflection. The moon occupies a curious position in the solar system. It rotates on its own axis, also revolves round the earth, and with the earth revolves round the sun. The same face, or side, of the moon is always turned toward the earth. The light of the small crescent of the new moon is much less than the light of the full moon because the new moon is at such an angle that the light of the sun is reflected only from a small portion of the moon's surface.

Motion. The orbit, or path, of the moon round the earth is elliptical, but constantly changing in its form. The line of apsides, or points of least and greatest distance from the center of motion, continually changes, performing a complete revolution in a little less than nine years. The motion of the moon is eccentric. One night it appears to be very close to some particular star, but the next night far to the east of that star, changing its position about 13° daily. At the time of the new moon the distance between sun and moon is at the lowest, and the moon is said to be in conjunction; at the full moon it is farthest away from the sun, and is in opposition. In its motion the moon is continually oscillatory, constituting what are called librations. Owing to these librations we see really more than half of the moon's surface. Only 41 per cent of the moon is never visible to us and a belt of about 18 per cent at the edge of the moon is alternately visible and invisible, owing to the oscillation.

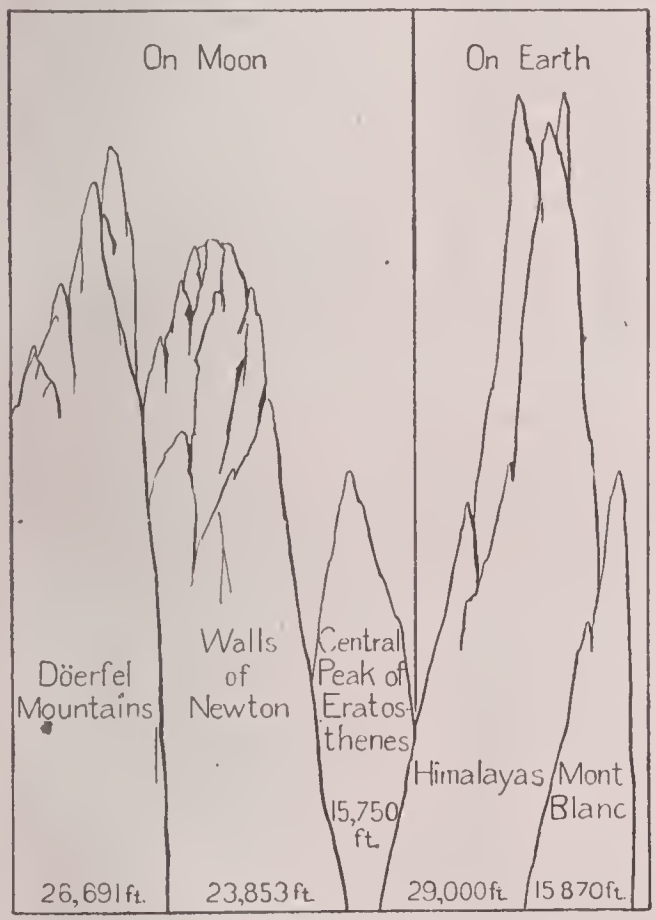
Craters. Studied through a telescope the surface of the moon appears to be marked with craters of extinct volcanoes, some of them having walls of 20,000 feet in height. Volcanoes on earth have craters of much less depth, the highest mountain mass only reaching a height of 29,000 feet, the crater occupying a very small portion. The moon is often referred to as a dead planet. Whatever life there ever was is extinct. The moon has grown old; its volcanoes are dead; its seas are empty, silent wastes. The volcanoes, in exhausting themselves, have apparently worn out the whole surface of the moon.



IMAGINARY VIEW OF MOON
Showing typical crater ring.

Photography of the Moon. Although modern instruments, especially telescopes of great power, have done much to increase the definite knowl-

edge of the moon, photography has done more. Telescopic cameras have taken photographs which can be studied at leisure, reproducing faithfully many things that would escape the human eye even when directed by such powerful lenses as those in the great observatories of the United States and England. The first photograph of the moon was taken in New York by Draper, in 1840. The photograph was crude, for the science of photography was in its infancy. The introduction of modern photographic methods has rendered possible photographs showing the surface of the moon as accurately and as much in detail as though it were within one hundred miles of the observer. The finest photographs have been produced at the Lick Observatory in California, the climate



COMPARATIVE ELEVATIONS

being particularly suitable for lunar observations. These photographs are taken by a telescopic camera, mounted on the equatorial principle, following the motion of the moon from rising to setting.

The "Man in the Moon." To everyone the world over, the "man in the moon" is familiar. In many pictures the moon is to be seen with a broad, smiling face looking down on earth, and it has been so for a very long time, for the story of the man in the moon is very old. The Chaldeans, Egyptians, Greeks and Romans all had different stories to account for the presence of "the man in the moon." All stories agree, however, in saying that the man was banished to the moon for bad conduct on earth. The most modern story, although hundreds of years old, is that of the old man who went to a forest to collect wood for his fire. It was Sunday, but still he needed warmth. An angel met him returning with his bundle on his shoulders, and asked him if he had forgotten it was Sunday, when all men should rest. The weary old man replied that Sunday and Monday were alike to him, as he had to work every day to feed and warm himself. The angel said as he could not observe Sunday on earth he should observe *Moonday* in heaven forever. So now the man in the moon is still seen on a clear night, with the fagot of wood on his shoulders.

Other Moons than Ours. Although to people on earth the moon is the most important object in the sky at night, it is in reality almost the most insignificant of all the glories of the heavens; its importance is derived from its nearness, not its size. There are other planets in the solar system which occupy the same relation to the sun as that held by the earth, for Jupiter, Mars, Neptune and Uranus have moons. Jupiter has eight satellites or moons, huge bodies with diameters of 2,000 or 3,000 miles. Mars has two, much smaller than those of Jupiter. Saturn has ten moons, the largest being Titan, 3,000 or 4,000 miles in diameter, at least twice the size of our moon. Uranus, a planet which is 180,000,000 miles distant from the sun, has four moons, which differ from all other satellites in that they revolve backwards. As the moon revolves round the earth, so in distant space those other moons revolve and rotate round their parent planets, and all continue throughout the ages their tireless journeys around the sun.

F.ST.A.

Consult Serviss's *The Moon;* Fauth's *The Moon in Modern Astronomy;* Naysmith and Carpenter's *The Moon as a Planet, a World and a Satellite.*

Related Subjects. The reader is referred to the following articles in these volumes:

Apsides
Atmosphere
Earth
Eclipse
Harvest Moon
Nebular Hypothesis
Sun
Telescope

MOON'FLOWER, a genus of plants belonging to the same family as the morning-glory, dodder and sweet potato, known as the *Convolvulus* family, embracing about 400 species. The greater number of these are twining or

trailing herbs and shrubs. The moonflower is known as a garden climber, being cultivated for its beautiful white flowers, which are large and sweet scented. These flowers open at night and close in the morning. The vines may be trained to grow to a height of about ten feet; the broad, heart-shaped leaves afford protection from the sun and make an excellent screen for porches. See CONVOLVULUS.

MOONLIGHT SCHOOLS. See SCHOOLS, subtitle *Special Schools.*

MOONSTONE, a whitish variety of feldspar (which see).

MOORE, *moor,* SIR JOHN (1761-1809), a British soldier whose heroic death will make him long remembered. Born at Glasgow, Moore entered the army as a lad of fifteen, serving with marked distinction in campaigns in the West Indies, Ireland, Holland and Egypt. In 1808, at the head of 10,000 men, he was sent to reënforce the British command in the Spanish Peninsula. His plan of campaign contemplated a junction with the forces under General Romana, which was frustrated by the failure of the Spanish commander to coöperate promptly. At Salamanca word reached him that Madrid had fallen and that Napoleon was marching with a superior force to crush him. Forced to retreat, he succeeded in reaching Coruña, after a hurried march across desolate mountains in the most inclement weather. Here, however, Soult forced his exhausted command to give battle. Moore was struck by a rifle ball, and fell just as his troops were achieving victory. The Reverend Charles Wolfe's poem on *The Burial of Sir John Moore,* the opening lines of which are here given, has helped to preserve his memory:

Not a drum was heard, not a funeral note,
As his corse to the rampart we hurried;
Not a soldier discharged his farewell shot
O'er the grave where our hero we buried.

MOORE, THOMAS (1779-1852), an Irish poet whose name is endeared to all people of his own nationality by his *Irish Melodies,* which stand as the best product of his genius as a poet. He was born in Dublin, educated at Trinity College, and in 1799 went to London to study law, but soon showed his preference for literature. In 1800 he published a translation of *Anacreon,* the Prince of Wales accepting the dedication of the poem. *The Poetical Works of the Late Thomas Little* was his next venture, the name being suggested by his own diminutive stature. He was appointed registrar of the admiralty court in Bermuda in 1803, but tired of the monotonous life, and the next year, after appointing a deputy, returned to England by way of the United States and Canada.

In 1807 he wrote the first of his *Irish Melodies,* which appeal not only to the Irish nation but to the whole Anglo-Saxon race. *Lalla Rookh,* an Eastern romance in verse, was written by the aid of books on Oriental themes. It was published in 1817 and brought its author $15,000, as well as the praise of the whole English-speaking world. In 1809 he went to Italy, but returned to England in 1822 and spent his last years in Wiltshire. His other works include the *Life of Sheridan, Life of Lord Byron, The Epicurean, History of Ireland,* and humorous verses, *The Fudge Family in Paris* and *Loves of the Angels.* His *Song of the Canadian Boatmen* is a lyric that almost sings itself.

MOORS, *moorz,* a name broadly applied to all Mohammedans who speak Arabic and who live in the Barbary states of North Africa. An organized state existed in what is now Morocco as early as 100 B.C. The Arabs overran this country in the seventh and eighth centuries, converting the inhabitants to the Mohammedan religion by force of arms, after a long, strenuous resistance. The Arabs crossed the Mediterranean and passed through Spain into France, where they were stopped at the Battle of Tours in 732, by Charles Martel. They then turned back into Spain, where, with thousands of Moors who came later, they established a powerful kingdom. During the time known as the Dark Ages, while the rest of Europe seemed buried in ignorance and warfare, the learning of the past was preserved and science and art and literature were developed by the Moors in Spain.

Throughout all Europe during this time states were beginning to form about powerful princes who by military force could maintain advantage. Such a prince was Ferdinand of Aragon in Spain, who married the equally powerful Isabella of Castile. Gradually the Moorish kingdom had become limited to Granada, where the Alhambra was their stronghold, and in 1492, while Columbus was sailing westward towards the New World, the armies of Ferdinand and Isabella conquered Granada. Great numbers of the Moors then returned to Northern Africa; those who wished, however, could remain in Spain by changing from the Mohammedan to the Christian religion.

They were then called *Moriscos* by the Spaniards, and any lapse to the old religion was punished with severity. The Inquisition was used as a means of keeping the Moors true Roman

Catholics. The punishment of the revolt incited by Philip II in 1568-1570 was completed by Philip III, and by 1610 the Moors had all been expelled from Spain. They were among the most vigorous, industrious subjects, and it was a great national misfortune that they were driven out. Those returning to Northern Africa were known as *Andalusians*. They settled in the coast towns, and became, with the other inhabitants, famous pirates, and remained so until the nineteenth century. It was these people who raided United States commerce in the Mediterranean Sea and were checked only when Commodore Decatur was sent against them in 1815 (see DECATUR, STEPHEN).

The present Moors are not, as is sometimes supposed, negroes. They are a white race, showing in swarthy skin and fine features their very mixed blood, for the original inhabitants intermarried with Romans, Arabs and Spanish. They are not well educated, despite their great dignity of manner, and are fanatical Mohammedans, remaining true to the faith of their fathers with all the ancient zeal.

Consult Fitzgerald's *In the Track of the Moors;* Lane-Poole's *The Moors in Spain.*

Related Subjects. The reader is referred to the following articles in these volumes:

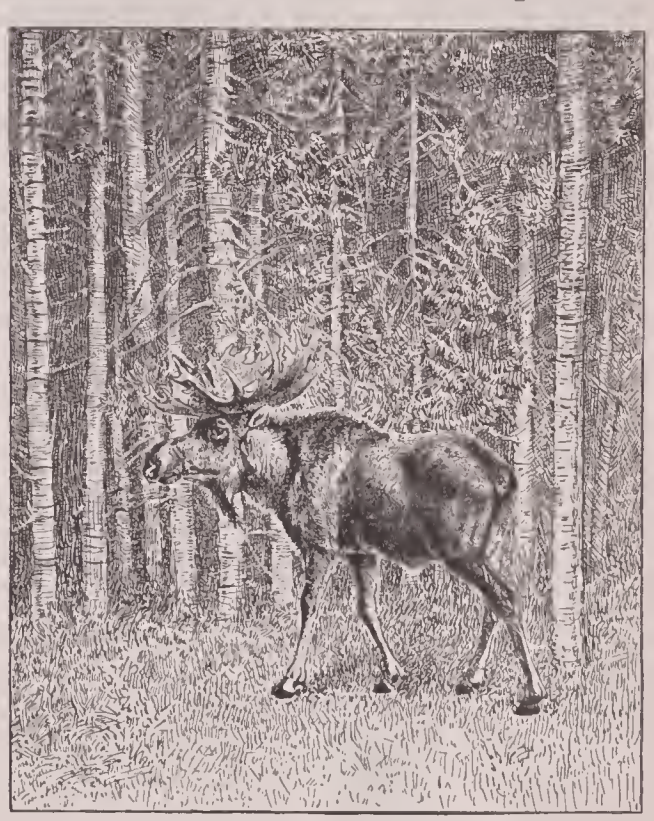
Alhambra	Granada
Ferdinand V	Isabella of Castile

MOOSE, the largest member of the deer family, stands from five to seven feet high at the shoulders, and has antlers that sometimes measure over six feet from tip to tip. His home is in the forests of Canada, Maine and Minnesota, and to a lesser extent those of the Northwestern United States. The European elk of Scandinavia, Russia and Prussia is a smaller moose, though the elk of America is a distinctly different animal.

Characteristics. The antlers of the male moose are striking. The fore part of them resembles the horns of a deer, but the branches at the back are united in a spadelike, flat surface, often over a foot wide, from which six to twelve short points protrude like spread fingers from the palm of the hand. The female has no antlers. The upper part of the moose's muzzle hangs flabbily three or four inches over the chin, and aids the animal in browsing for its favorite foods of soft twigs and bark, moss, and the stems and leaves of water lilies. Its front legs are longer than those behind, giving it a clumsy gait and making it necessary for the animal to get on its knees when eating from the ground. It often rears against young trees, bending them over with its weight in order to reach the upper branches.

In the summer moose live in solitude on the shores of lakes and swamps, only the mothers and their young of less than three years being found together. They spend the winter in evergreen forests, several families living together in a space of a few acres known as a *moose yard.*

With all its apparent clumsiness the moose is swift and powerful. It can charge at full



THE KING OF WOODLAND ANIMALS

speed through thickets in which a man has almost to hew his way. It never gallops, but runs with a high step. In spite of restrictions on moose hunting in both Canada and the United States, the animal is in danger of becoming extinct.

"Bull Moose" Party. In 1912 when the National Progressive party was organized in the United States it was popularly called the "Bull Moose Party," because its leader, Theodore Roosevelt, said upon his return home from abroad that he felt as "fine as a bull moose."

MOOSEHEAD LAKE, the largest lake in New England, in Western Maine, forming part of the boundary between Somerset and Piscataquis counties. It is thirty-five miles long and in width varies from one to ten miles. Though it is deep enough for navigation there is only one steamship line, and that is mostly for the accommodation of the many hunters and tourists who come each year for the fine fishing and hunting. Bear, deer and elk are

found in the great pine forest, and almost every kind of fresh-water fish will rise to the hopeful angler's bait, although the speckled trout, pickerel, pike and bass are most plentiful.

MOOSE JAW, a city in the south-central part of Saskatchewan, one of the most important communities in the Canadian West. It is about midway between Winnipeg and Calgary, on the main line of the Canadian Pacific and on important branches of the Canadian Northern and Grand Trunk Pacific railways. By the shortest rail route Moose Jaw is 300 miles west of Winnipeg and 438 miles east of Calgary. Regina is forty-two miles east of Moose Jaw, and Swift Current is 110 miles west. Moose Jaw was settled about 1883, was incorporated as a city in 1903, and in 1912 adopted the commission form of government. How Moose Jaw got its name is an interesting story. The Indians say that about the year 1860 a pioneer, Lord Dunmore, with his wife and child, camped on the banks of what is now called Thunder Creek. There he mended a broken wheel on his Red River cart with the jaw-bone of a moose, and the Indians afterward spoke of this spot as the place where the white man found the moose jaw. The city has had a remarkable growth; its population increased from 1,558 in 1901 to 13,823 (Dominion census) in 1911. Population in 1916, 16,889.

Moose Jaw is in the heart of the greatest wheat belt in North America, and naturally receives and ships millions of bushels a year. It has one of the three large interior storage elevators (capacity 3,500,000 bushels) owned by the Dominion government, and also a number of privately-owned elevators. Moose Jaw's flour mills have a daily capacity of 5,000 barrels and are among the chief industrial establishments. Leading industries are slaughtering and meat-packing and the manufacture of war munitions. The Canadian Pacific Railway in its local yards and shops employs about 2,000 men. Moose Jaw is important also as a wholesale center, and is a distributing point for a territory whose radius is 200 to 300 miles.

The city has a large number of attractive buildings, both public and private. Noteworthy are the post office, erected in 1915 at a cost of $300,000; the armory, completed in 1914 at an expense of $150,000; the public library, and the Young Women's Christian Association. Worthy of special mention among the business blocks are the Hammond Block and the Walter Scott building. Other conspicuous structures are the collegiate institute, Saint Andrew's Presbyterian Church, Zion Church (Methodist), the land titles building, the general hospital and Saskatchewan College, a residential school for boys. Crescent Park, River Park and River Drive are attractive features. Moose Jaw is especially fortunate, for a prairie city, in having opportunity for boating and bathing, and its aquatic club is stimulating interest in water sports. Thus Moose Jaw River, though of no commercial importance, adds greatly to the enjoyment of the citizens. The city owns and operates its electric light and power plant and its water works. Water is piped from Caron Springs, a distance of twenty-two miles. For fire protection a high-pressure system was installed in 1913. Moose Jaw's electric street railway was the first in Saskatchewan. W.F.H.

MOOSE RIVER, one of the large streams which drains Northern Ontario into Hudson Bay. It is formed by the confluence of the Mattagami and the Missinaibi, the former being considered the main stream. The Moose proper, from the confluence to its mouth at the southern end of James Bay, is seventy-five miles long, but from the head of the Mattagami to the mouth of the Moose is a distance of 340 miles. About thirty-five miles from its mouth the Moose receives another large stream, the Abitibi, which is also 340 miles long and has its sources east of the Mattagami. These streams, with their tributaries, spread out in the shape of a fan, and drain nearly the whole of the Timiskaming district. The area of this drainage basin is 42,100 square miles. Moose Factory, a famous post of the Hudson's Bay Company, is on the Moose River near its mouth.

MOOSOMIN, *moo'so min,* a town in southeastern Saskatchewan. It is on the main line of the Canadian Pacific Railway, eighty-seven miles west of Brandon, about twelve miles west of the Manitoba boundary, and 138 miles east of Regina. Moosomin is one of the older towns in the Northwest; it was incorporated as a town in 1889. It has a land titles office, customs office and provincial jail, and is the seat of a judicial district and a district headquarters of the Royal Northwest Mounted Police. It also has a normal school, a school of music and a collegiate institute in addition to the regular public schools. The region surrounding Moosomin is noted as a mixed farming district. Population in 1911, 1,143; in 1916, about 1,400.

MORAINE, *mo rain',* a mass of rock and gravel carried by a glacier and deposited at its lower end. The rocks and gravel are gathered

as the glacier moves down the valley until they form regular walls along the sides. These are called *lateral* moraines. Others, near the middle of the glacier, are *medial* moraines, and the mass deposited at the end forms the *terminal* moraine, which continues to increase in size as rocks and gravel are added to it from year to year. Some of the moraines of the Glacial Period are so large that they form ranges of hills. See GLACIER; GLACIAL PERIOD.

MORALITY, *mo·ral'i·ti,* **PLAY,** a drama in which the characters personify abstract ideas, such as virtue, vice, wealth, poverty, knowledge, ignorance, innocence, jealousy, etc. These plays were first produced in England in the fifteenth century and, with the *miracle* and *mystery* plays, all growing out of Church pageants, gave rise to modern drama. They were meant to teach a needed reform and were sometimes a bit dull. The vices, better understood by humanity than the virtues, played many tricky pranks and furnished, indeed, the humorous element. The clowns and fools, superbly created by Shakespeare, were a development of the vices of the morality play.

Ben Greet and his company of English players revived, in 1902-1903, one of the best old morality plays, *Everyman.* It first appeared in the fifteenth century; the author is unknown. The two best modern morality plays are *Everywoman,* written by Walter Browne in 1911 in the style of *Everyman,* and *Experience,* written by George Hobart and produced in 1914.

Related Subjects. The following articles in these volumes may well be read in this connection:

Drama	Miracle Play
Literature	Mystery Play

MOR'ALS COURT. The brotherly spirit of helpfulness of the modern age has found concrete expression in many ways. The social settlement and the juvenile court are among the agencies developed within recent years for the uplift of the weak, the unfortunate or the vicious, and to these has been added the morals court, for the trial of persons charged with offenses classed as vice.

The first morals court in the world was established in Chicago, Ill., in 1913, and other cities at once watched its career with interest. It coöperates with vice and public morals commissions, working with them to free cities from the terrible effects of vice and immorality, to trace evil to its sources and to reclaim those who have yielded to debasing influences. The accused finds himself in an atmosphere of sympathy rather than of censure, for social workers, nurses and investigators are present to advise and aid those brought to the court for trial. These trials are not open to the general public, but statistics and records of cases are compiled and made available for social investigators. The sponsors of this institution look forward to the time when hospitals for the treatment of the sick and other helpful agencies will be maintained in connection with the morals court. It is even now opening the way for wiser and more kindly handling of moral offenses, and its administration is tangible evidence of the reality of the spirit of universal brotherhood.

The second morals court in the world was instituted in New York City in 1915. In both Chicago and New York the presiding judge was selected from the large number of judges of the regularly-constituted courts.

MORAVIA, *mo·ra'vi·a,* a rich, northwestern crownland of Austria-Hungary, ruled by a margrave, or governor, and an assembly known as the diet. The country, which has an area of 8,584 square miles, is a plateau surrounded by hills and mountains and drained by the March River, a tributary of the Danube. The climate is mild and healthful. Moravia lies within the zone of the great War of the Nations (which see), and in the Carpathian Mountains, on the east, have been fought some of the fiercest battles of history.

LOCATION MAP

Three-fourths of the inhabitants are Slavs, and nearly one-fourth are Germans. The language spoken is a corrupt form of German. The principal occupations are agriculture and stock raising, mining and manufacture. Moravia is especially noted for the manufacture of woolen goods. Large flocks of sheep supply the wool for this industry. The cultivation of cereals, such as wheat, oats, rye, barley, corn and flax, is superior to that of most of the other provinces of Austria-Hungary. Great quantities of sugar beets are grown for the making of beet sugar. Leather goods, yarn, silk, wine, glass and machinery are made in Moravia, and with woolen goods and sugar are the principal exports of the province.

The Moravian Church was organized in Moravia and Bohemia under the leadership of John Huss (which see). It is noted for its missionary.

work in such distant places as Alaska and Greenland, and among such unfortunate beings as lepers. Few of this sect are to be found in Moravia; the greater part of the inhabitants are at present Roman Catholics. The capital and largest city is Brunn, which has a population of nearly 126,000. In 1912 the crownland had an estimated population of 2,651,300.

MORAVIAN BRETHREN, a Protestant sect or Church which arose in Moravia and Bohemia after the death of John Huss, a Bohemian reformer (see HUSS, JOHN). The first church was established in 1722 by Count Nicholas Zinzendorf at Herrnhut, which means "The Lord's Watch." Moravian refugees came to America in 1735 and settled at Savannah, Ga., but in 1740 removed to Pennsylvania and founded a settlement in Northampton County, on the Lehigh River. They were so energetic that in three months they cleared the ground, built log houses and purchased 500 acres of additional land. Other pioneers came, and on Christmas Eve of that year they celebrated the Lord's Supper and sang a hymn beginning:

> Not Jerusalem; lowly Bethlehem
> 'Twas that gave us Christ to save us.

So moved were they by this hymn that by common consent they called the place Bethlehem, and the church at this place is the mother of all Moravian churches in America.

The entire body of Moravians is organized into three provinces, German, English and American, the Church being governed from Herrnhut in Saxony by a general synod which meets every ten years. In the United States the total number of communicants is about 21,000, and there are about 140 churches. Moravians are zealous in missionary work and noted for earnest piety. Their religion does not differ from that of other Protestant churches in main points of Christian doctrine.

MOR'DANTS, the name given to compounds which unite chemically with dyestuffs to produce a permanent color, especially in the dyeing of wool and silk goods. In some cases, however, as in lake dyes, the action is mechanical rather than chemical. The chief mordants are solutions of iron, aluminum and tin salts and tannic acid. Calico patterns are first printed with a mordant which will combine with the proper color when immersed in the dye, leaving the rest of the cloth unaffected.

MOR'DEN, a town of Manitoba, situated in Lisgar County, on Dead Horse Creek and on the Canadian Pacific and Great Northern railways, eighty-two miles southwest of Winnipeg. The chief manufactures are flour, lumber and machinery. The town contains a number of grain elevators. Morden is the center of the southern judicial land titles and surrogate court districts. Among its public buildings are a fine post office, completed in 1915, a courthouse and jail of the most modern type, erected at a cost of $35,000, a hospital and nurses' home. A 320-acre Dominion experimental fruit farm is near by. The town owns its electric light plant. Population in 1911, 1,130; in 1916, about 1,500.

MORE, SIR THOMAS (1478-1535), a lord chancellor of England and the author of the celebrated *Utopia*. Educated at Oxford, he entered Parliament and quickly showed an independent spirit by opposing certain grants of money to Henry VII. His scruples cost him the royal favor, and he left Parliament not to return to public life until the accession of Henry VIII.

More sympathized cordially with the tolerant attitude which the new king adopted towards the Roman Catholic Church, and this fact, together with his conspicuous gifts, marked him for a post of authority. On the fall of Wolsey, he became chancellor, a post he continued to fill until growing friction with his royal master led him to resign the office. He could not conceal his disapproval of Henry's treatment of Catharine of Aragon (which see), neither was he prepared to accept the king's rupture with the Church of Rome—a rupture brought about by the refusal of the Pope to sanction the divorce from Catharine. The king's vengeance pursued More into private life. He was charged with high treason and cast into the Tower of London. His eloquent plea in defense of his acts was unavailing, and he met death on the scaffold with characteristic fortitude on July 6, 1535.

More knew and was esteemed by the most eminent men of his generation, including the great Erasmus. The nobility of his spirit lives for us to-day in the *Utopia*, a stirring vision of an ideal commonwealth that has inspired many later humanitarian dreamers.

MORELIA, *mo ra' lyah,* the capital of the state of Michoacán, Mexico, situated about 130 miles northwest of the city of Mexico, and 6,314 feet above sea level. Valladolid was the original name of the city, but in 1828 it was changed to Morelia, in honor of Morelos, a Mexican patriot and soldier. There are many impressive public buildings, cathedrals and libraries, the aggregate number of volumes in the latter being estimated at 70,000. Cotton and woolen goods, palm hats, sugar, pulque and

cheese are manufactured, and the city also produces a high-grade candy from the fruits of the district. Population, 1910, 40,000.

MORGAN, Sir Henry (1635-1688), an English buccaneer, or sea robber, who ravaged a great part of tropical America. He was born in Llanrhynny, Wales, and at an early age shipped as a sailor for Barbados, from there working his way to Jamaica, where he joined the crew of a pirate vessel. By 1663 he was master of his own ship and was sent to Cuba by the lieutenant-governor of Jamaica, soon acquiring fame by daring attacks on Central America and West Indian towns. He captured Maracaibo in 1669 and put the inhabitants to torture, and a year later ravaged the coasts of both the mainland and Cuba. In 1671 he plundered the city of Panama, and then returned to Jamaica. After peace had been declared between England and Spain in 1672 he was sent a prisoner to England, but managed to secure vindication for his acts, and in 1674 was sent back to Jamaica as commander-in-chief of the British forces in the colony.

MORGAN, John Hunt (1825-1864), an American military commander, leader of a company of Confederate soldiers known as "Morgan's Raiders," who figured in many daring expeditions during the War of Secession. He was born in Huntsville, Ala. During the war with Mexico he served under General Taylor, with the rank of lieutenant, but joined the Confederate army on the outbreak of the War of Secession. In this conflict he attracted wide notice as captain of a band of volunteer cavalry, when he began a series of raids which destroyed public property, railroad trains, military supplies and bridges. A spectacular "Christmas Raid" in Kentucky, in 1862, won him a vote of thanks from the Confederate Congress.

The following year, hoping to draw off General Rosecrans from his Tennessee campaign, Morgan crossed the Ohio River and devastated several towns in Ohio and Indiana. Driven out of these states, he attempted to join Lee in Pennsylvania, but in July, 1863, was captured and placed in the penitentiary at Columbus, O. The following November he escaped and resumed his career of guerrilla warfare, but was defeated in Kentucky. Having retreated to Greenville, Tenn., he was surrounded by Federal troops while resting in a farmhouse, and was shot while attempting to escape.

MORGAN, John Pierpont (1837-1913), the greatest financier that America has produced. He was born at Hartford, Conn., received an excellent education in the English High School of Boston and at the University of Göttingen, Germany, and at twenty began work in a banking house in New York City. He early perceived great opportunities for a banking system that could finance the vast industrial projects of America, and from the time he became a member of Drexel, Morgan & Company in 1871 his chief aim was the perfecting of such a system. He ultimately reorganized the above firm into the house of J. P. Morgan & Company, and aided more than any other man in America in giving financial strength to railways and in consolidating industrial corporations. His executive ability and his credit were such that he was intrusted with the complete sale of the $62,000,000 United States bond issue during Cleveland's administration, was given entire charge of American subscriptions to the British war loan of $50,000,000 in 1901, repeatedly aided in the financial affairs of China and Japan; and organized and disposed of the complete securities of the United States Steel Corporation, amounting to $1,100,000,000. During the last year of his life his policies were severely criticized by Congressmen and other government officials, and the resulting inquiry seemed to increase a nervous trouble with which he was afflicted. He went for rest to Rome and died there very suddenly.

J. PIERPONT MORGAN

His gifts to education and charity were large, among them being $1,500,000 to the Lying-In Hospital in New York, large amounts to trade schools and to the Cathedral of Saint John the Divine of that city, frequent sums of money to the University of the South at Sewanee, Tenn., and numerous valuable pictures, statues, books and specimens to American libraries and museums, especially the Metropolitan Museum of Art, New York City, to which he gave works valued at more than a million dollars.

John Pierpont Morgan (1867-), son of the above, was born in New York and educated at Harvard University. After being graduated from Harvard he entered the firm of J. P. Morgan & Company, New York, and the firm of Morgan, Grenfell & Company, London. He

became a stockholder and director in many large corporations. At his father's death he inherited most of the estate and filled numerous positions that had been occupied by J. P. Morgan senior. In 1914 he was made the official British representative for placing contracts in the United States for the manufacture of munitions during the War of the Nations. In 1915 he organized a syndicate to float a loan of $500,000,000 to England and France.

J. P. MORGAN
Present head of the powerful banking firm established by his father.

MORGAN, JOHN TYLER (1824-1907), an American lawyer and statesman of the South, notable for his services as United States Senator from Alabama for thirty years. During his Senatorship he was recognized as one of the ablest of Democratic leaders, and for some years was chairman of the Senate committee of foreign relations. He was also chairman of the commission on interoceanic canals, a member of the board of arbitration concerning the Bering Sea fisheries, and one of the commission appointed by President McKinley to organize a government for the Hawaiian Islands. He was renowned for his speeches made in behalf of Cuban independence.

Although a native of Athens, Tenn., Morgan received most of his education in Alabama and began the practice of law at Talladega in 1845. He served as a member of the state convention that passed the Ordinance of Secession in 1861. Joining the Confederate army as a private, he was promoted to the rank of brigadier-general. After the war he resumed the practice of law at Selma, and after serving twice as Presidential elector was elected to the Senate for five successive terms.

MORGANATIC, *mor ga nat'ik,* **MARRIAGE.** See subhead, in article MARRIAGE.

MORGANTOWN, W. VA., the county seat of Monongalia County, situated on the Monongahela River, near the northwest state boundary line. It is on the Baltimore & Ohio and the Morgantown & Kingwood railroads, and is fifty miles southeast of Wheeling, sixty miles south of Pittsburgh and about 100 miles by rail from both cities. River commerce extends to Fairview, twenty-six miles southwest of Morgantown. The area of the city is three square miles. The population, which in 1910 was 9,150, was 13,709 (Federal estimate) in 1916.

Morgantown is the seat of the University of West Virginia (which see), with an attendance of 1,700 students, and besides the noteworthy buildings of the campus, which include a fine library, armory and mechanical hall, the city has a Federal building, completed in 1915 at a cost of nearly $100,000, and a number of attractive churches. Cheat River, a few miles distant, is a stream of much scenic beauty. The city has valuable natural resources consisting of timber, natural gas, coal, iron, limestone, clay and glass sand; and it manufactures sheet and tin plate, window glass, pressed prism glass, wire glass and mirrors.

A settlement made here in 1768 by David and Zackwill Morgan was named in honor of the latter, incorporated in 1785 as Morgan's Town, and became a city in 1905. J.A.P.

MORIN, *mo raN',* AUGUSTE NORBERT (1803-1865), a Canadian jurist and statesman, for a quarter of a century one of the most conspicuous Liberals of Quebec, twice Premier of Canada under the Union Act of 1841. Morin was born at Saint Michel, Que., received his schooling at the Quebec Seminary, then studied law, and in 1828 was called to the bar. Two years later he was elected to the Quebec assembly, in which his talents won immediate recognition, so that in 1834, when commissioners were sent to London to inform the British government of political conditions in Canada, Morin was chosen one of the commissioners.

After the Union of Upper and Lower Canada, he was elected to the Canadian assembly. He became a prominent follower of Lafontaine and Baldwin, in whose first Ministry he was commissioner of crownlands (1842-1843). Reëlected to the assembly in 1844, he served as a private member until 1848, and as speaker from 1848 to 1851. Throughout the long struggle for responsible government, Morin labored faithfully for reform. His high standards, his ability and his experience gave him a respected position among Canadian public men, and on the retirement of Sir Louis Lafontaine Morin was chosen to succeed him as leader of the Lower Canada Liberals. He joined with Sir Francis Hincks in 1851 to form a Ministry, which held office until 1854, when it was defeated because of the delay in disposing of the questions of clergy reserves and seigniorial tenures. Morin resigned, but so strong still was his influence that he was able to form a coalition Ministry, the MacNab-

Morin administration, for the express purpose of carrying through the long-delayed reforms. In 1855, shortly after the changes were made, Morin resigned on account of failing health, and accepted the less arduous position of a judge of the superior court of Quebec. He remained on the bench until a few months before his death.

MORLEY, HENRY (1822-1894), an English essayist and editor, born in London. He was educated at a Moravian school in Germany and at King's College, London, and, after practicing medicine a brief time, established a school on Moravian methods at Manchester and later at Liverpool. Some ironical papers, entitled *How to Make Home Unhealthy,* received favorable attention from Charles Dickens and he induced Morley to aid him in editing the magazine, *Household Words.* From that time his energies were devoted to writing and editing, among his most successful works being *Lives, A Defense of Ignorance, English Writers* (11 volumes), *A First Sketch of English Literature* and *English Literature in the Reign of Victoria.* He edited a library of *English Literature,* the famous *Universal Library* and *Cassell's National Library.* As a critic and a scholar he was defective, but he had excellent taste and the knack of popularizing scholarly subjects.

MORLEY, JOHN, First Viscount Morley of Blackburn (1838-), an English author and statesman, born at Blackburn, Lancashire. He was graduated from Oxford, and in 1859 was admitted to the bar. Soon afterward he entered on a long period of professional authorship, serving successively as editor of the *Literary Gazette,* the *Fortnightly Review,* the *Pall Mall Gazette* and *Macmillan's Magazine.* In the meantime he produced an excellent *Life of Edmund Burke* and a *Life of Richard Cobden.* In 1883 he was sent to Parliament, and three years later was made secretary for Ireland under Gladstone. He was several times reëlected to the House, and distinguished himself as one of the leaders of the liberal party. Under Sir Henry Campbell-Bannerman he was in 1905 made secretary of state for India, and this post he retained under Asquith, being transferred, however, in 1908 from the House of Commons to the House of Lords, as Viscount Morley of Blackburn. He was Lord President of the Council for three years, resigning in 1914. Among his works, besides those named above, are *Voltaire, Rousseau, Diderot and the Eneyelopaedists; Oliver Cromwell,* and an unusually sympathetic *Life of Gladstone.* His *Life of Burke* appears in the " English Men of Letters" series, of which he was chief editor.

JOHN MORLEY
(Viscount Morley of Blackburn.)

MORMONS, *mawr'munz,* officially called THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS, is a religious sect founded by Joseph Smith in 1830 and now numbering over 500,000 adherents in various parts of the world. A majority of the members live in Utah, which is practically a Mormon state, but there are large numbers in Idaho, Wyoming, Colorado, Arizona and other states. Prosperous Mormon colonies have been established in Mexico, the Sandwich Islands, Australia, New Zealand and Canada. Some Mormons live in every civilized nation on the globe.

Doctrines of the Church. The Mormons, it must be understood, are a Christian sect. They believe in God and Jesus Christ, and in Joseph Smith, as a modern Prophet. They believe that God sent no message to man from the time of Christ and his apostles until his revelation to Joseph Smith. The Bible is accepted as the gospel, but is supplemented by the Book of Mormon and by revelation through the president of the Church.

The salvation of man is possible, according to Mormon doctrine, only through belief in Christ's atonement, repentance for sin, and baptism for the remission of sin. Baptism is by immersion and is the necessary preparation for the Holy Ghost, which is received through the laying-on of hands by the duly authorized priesthood of the Church. The Mormons also believe that all baptisms from the days of Christ's apostles to the time of Joseph Smith are void. Friends of the dead, however, may be baptized in their stead, and in this way George Washington, Benjamin Franklin and others have been received into the Church. Infant baptism is not practiced, Mormons considering the age of accountability as eight years, when they are baptized.

The Mormon beliefs in regard to marriage have been more widely discussed and misunderstood than any other feature of their creed. According to the revelation on this subject, all

marriages on earth without divine authority are ended by death. On the other hand, if marriage is accompanied by the ceremony of *sealing,* by an authorized member of the priesthood, a man and woman are wedded for all eternity. This term is taken from the closing words of the marriage ceremony as performed by the Prophet Joseph Smith and his successors: "All these blessings, together with all other blessings pertaining to the new and everlasting covenant, I *seal* upon your heads, through your faithfulness, etc." A man may be sealed to any number of women, but a woman may be sealed to only one man. As in baptism, marriage and sealing may be by proxy, in order to assure salvation to men and women who have left this world still unsealed, but are not to blame for this fact.

The Book of Mormon contains a strong denunciation of polygamy, with a permissive clause, however: "For if I will," saith the Lord of Hosts, "Raise up seed unto me I will command my people; otherwise they shall hearken unto these things" (Book of Mormon, Jacob, Chapter 11, v. 30). Plural marriage is now abandoned in practice. But for nearly forty years polygamy was the exception rather than the rule; only three per cent of the men accepting the difficult rule. Brigham Young, in 1852, publicly announced the revelation on the subject of plural marriages, which had been given in private by the Prophet in 1843. According to this revelation, the saints, when they leave earth, are deified, and their business in Heaven, the perpetuation of family life, is the propagation of souls to occupy the bodies of people born on various earths, being a part of their glorification. The glory of a saint in Heaven is in proportion to his intelligence, his obedience to law and to his experience on earth. The marriage of one man to a number of women on earth purifies, through continence, sobriety, and affection, the man and the women, making possible the bringing onto the earth of a better race of children, at the same time making for the creation of enough bodies for the thousands of disembodied spirits which are awaiting pure and wholesome incarnation. The contradiction between this revelation and the present practice is explained by Mormon scholars as due to the laws of the United States which prevent the saints from carrying out the commands received through revelation, but as the saints have tried to obey they will not be punished for their apparent failure to heed these commands.

Church Government. At the head of the Church is the president, who is the successor of Joseph Smith. Associated with him are two counselors. These three, who are declared to be the successors of Peter, James and John, constitute the *first presidency,* in the priesthood of Melchisedek, and thus preside over the whole Church. Below them rank the patriarch, whose function it is to bless and lay on hands, and the Twelve Apostles, who are a high council of the Church; and in case of the death or disability of the president they exercise his powers. These high officials, together with the elders and high priests, comprise the priesthood of Melchisedek. The subordinate priesthood of Aaron includes the priests, teachers and deacons. The Church is divided into about fifty *stakes,* nearly half of which are in Utah. Each stake is divided into wards, and each ward into districts, each of which has its meeting-house, Sunday school, Woman's Relief Society and social organizations.

History of the Mormon Church

The Revelation to Joseph Smith. According to Joseph Smith it was on the night of September 21, 1823, that the angel Moroni appeared to him and told him that a book containing the history of the ancient inhabitants of America was buried in Cumorah Hill, about four miles from Palmyra, N. Y. The next day Smith went to the hill and found the book, but the angel told him the time to remove it had not yet come. Not until four years later, on September 22, 1827, did the angel allow Smith to take the book. It was written in strange characters on golden plates, and the volume was closed with three clasps. Each plate was nearly eight inches long by seven inches thick, but a part of it was sealed, and only the unsealed part was revealed to Smith at that time, the rest being reserved for future revelations.

The next two years were devoted chiefly to the translation of the characters, which were in "reformed Egyptian." With the book he had received a pair of spectacles, two transparent crystals set in a silver bow, by the aid of which he could translate the characters. Smith sat behind a curtain and read aloud his translation, while his wife, with Martin Harris and Oliver Cowdery, wrote down his dictation. These, with Smith's father and two brothers

and three other witnesses, later solemnly testified that they had seen the plates. When the translation was completed, Martin Harris, a farmer, supplied the money to print the book, and an edition of 5,000 copies was prepared and offered for sale in 1830, at $1.25 a copy.

The Book of Mormon. This was the name chosen from the title-page, which was given on the plates, "The Book of Mormon: An account written by the hand of Mormon upon plates taken from the plates of Nephi." Mormon was the last of the prophets upon the American continent, and he gave the plates to his son Moroni, who hid them in the hill of Cumorah, about 1,400 years before they were delivered to Joseph Smith, on the eve of the last battle between the Nephites and Lamanites.

The Book of Mormon purports to be a history of America from its first settlement until the beginning of the fifth century of the Christian Era. According to this account the first settlement was made by a colony of Jaredites, who were driven from the Tower of Babel to America. The Jaredites, in the course of centuries, killed one another off, and about 600 B. C. a new colony was founded by one Lehi, his wife, his four sons and twelve friends, all of whom came directly from Jerusalem and landed on the coast of Chile. After his death his youngest son, Nephi, was divinely appointed to succeed to his leadership. At this evidence of divine favor his brothers were angry, but they were promptly punished for their show of jealousy by being turned into a dark-skinned, idle people called *Lamanites*. From them, the narrative states, sprang the North American Indians.

According to the story, the Nephites, or good Hebrews, gradually fell away from the true faith, in spite of the intercession of Christ, who appeared in America after his resurrection. Finally, the Nephites were practically annihilated by the Lamanites in a great battle at the hill of Cumorah, in 384 B. C. Among the few who escaped were Mormon and his son, Moroni. Mormon preserved the records of his people, and Moroni added an account of events within his own memory. This book of records he buried on the hill of Cumorah, with the divine assurance that God's chosen prophet would some day discover it.

Organization and Growth of the Church. With the Book of Mormon as their authority, Joseph Smith and five others organized a church at Fayette, Seneca County, N. Y., on April 6, 1830, and within a short time were sending forth missionaries in all directions. In 1831, guided by a revelation, Smith decided to move to Kirtland, Ohio, and in the same year the Mormons founded a colony at Independence, Mo., which latter was to become the New Jerusalem. In 1835 the Twelve Apostles, including Brigham Young, were chosen. Meanwhile, from the beginning the Mormons had been steadily persecuted, and the Missouri colony, after being driven out of two localities, was finally assigned to a thinly-settled region, now part of Caldwell County, where was built the town of Far West. Affairs in Kirtland had not prospered, and there were disputes with the state authorities because the Kirtland Safety Society Anti-Banking Co., controlled by some of the Mormons, had failed. There was also dissension within the Church, for a strong faction tried to remove Smith from the leadership.

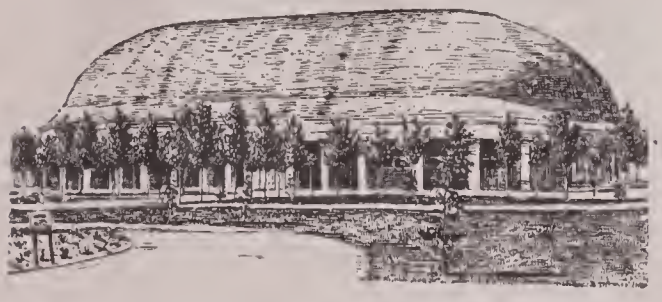
Early in 1838 Smith left Ohio for the Mormon settlement at Far West, Mo. Here, however, the Mormons were already in difficulties with their gentile neighbors. From threats and quarrels they came to blows, from blows to rioting, and from rioting to a state of civil war. The climax came in the autumn of 1838, when a company of militia murdered about twenty Mormons at Hawn's Mills. Smith and Sydney Rigdon, one of his counselors, were later arrested and imprisoned for murder, felony and treason. Most of the Mormons, then about 15,000 strong, crossed the Mississippi River into Illinois, where they founded the town of Nauvoo. Smith and Rigdon managed to escape from prison, and rejoined their followers in Illinois.

At Nauvoo the Mormons were welcomed by the leaders of the great political parties and were given a special charter for the city. Here the question of polygamy arose, for it became generally known that Smith was living with several wives and was about to announce a revelation on the subject of "celestial" marriages. A number of bitter apostate Mormons, who were indignant at Smith's conduct, established the Nauvoo *Expositor* for the purpose of opposition and persecution. Only a single number (June 7, 1844) appeared, and it was filled with calumnies of women and tirades against the Prophet and the orthodox Mormons. The city council declared the paper a public nuisance, and three days later the plant was destroyed by the city officials. This led to a general uprising of the gentiles against them, while Joseph Smith, his brother Hyrum and

others were arrested on June 25, 1844, on a charge of treason, and were imprisoned at Carthage. Two days later a mob invaded the jail and shot the two brothers.

The death of Smith eventually led to divisions in the Church, the body of the members accepting the leadership of the Twelve Apostles with Brigham Young at their head, as Joseph Smith's successor, while another small faction maintained that young Joseph Smith, son of the Prophet, should be his successor. One faction followed Strang and settled on Beaver Island. Prosperity for the Church in Illinois was at an end, and in 1845 the Mormons agreed to leave the state. Led by Brigham Young, they began their westward migration in the next year, and in September, 1848, the first settlers arrived at the new chosen site on the shores of Great Salt Lake in Utah.

The Mormons in Utah. Though differences of opinion may exist as to the doctrines or practices of the Mormon Church, there can be only one verdict as to their work in Utah. Here, if ever, the prophecy of Isaiah (XXXV, 1) was fulfilled: "The desert shall rejoice and blossom as the rose." At first there was suffering from lack of food, clothing and shelter, but soon there was abundance. The discovery of gold



MORMON TABERNACLE, SALT LAKE CITY

in California, followed by the stream of gold seekers who made Salt Lake City a stopping place, brought prosperity. Mormon settlers arrived from all parts of the United States, several thousand came from England, and by 1852 there were about 30,000 Mormons in the valley of Great Salt Lake.

For a number of years there was conflict between the United States government and the Mormons. The latter applied for admission to the Union in 1849 as the "State of Deseret," but met with refusal. Utah, however, was organized as a territory in 1850, and Brigham Young was governor for seven years. He proved an able leader. The colony flourished, agriculture being its main support. The United States is indebted to Brigham Young for the introduction of irrigation in modern times, the Mormons proving that irrigation would produce rich crops on the soil of the American "desert." In 1857 the government sent troops to Utah, partly to get Johnston's army out on the frontiers in case of civil war, and partly because of false rumors carried to Washington. During the War of the Secession the Mormons were loyal. The first overland telegram was sent by Brigham Young to Abraham Lincoln in 1861, "Utah is loyal. Has not seceded from the Union." Later the hostility between the Church and the Federal government gradually declined. The spread of polygamy, however, caused new conflicts, and it was not until 1890 that the president of the Church advised members to refrain from polygamous marriages. The Reorganized Church of Jesus Christ of Latter-Day Saints, which was established because Young openly introduced plural marriages, has always opposed polygamy.

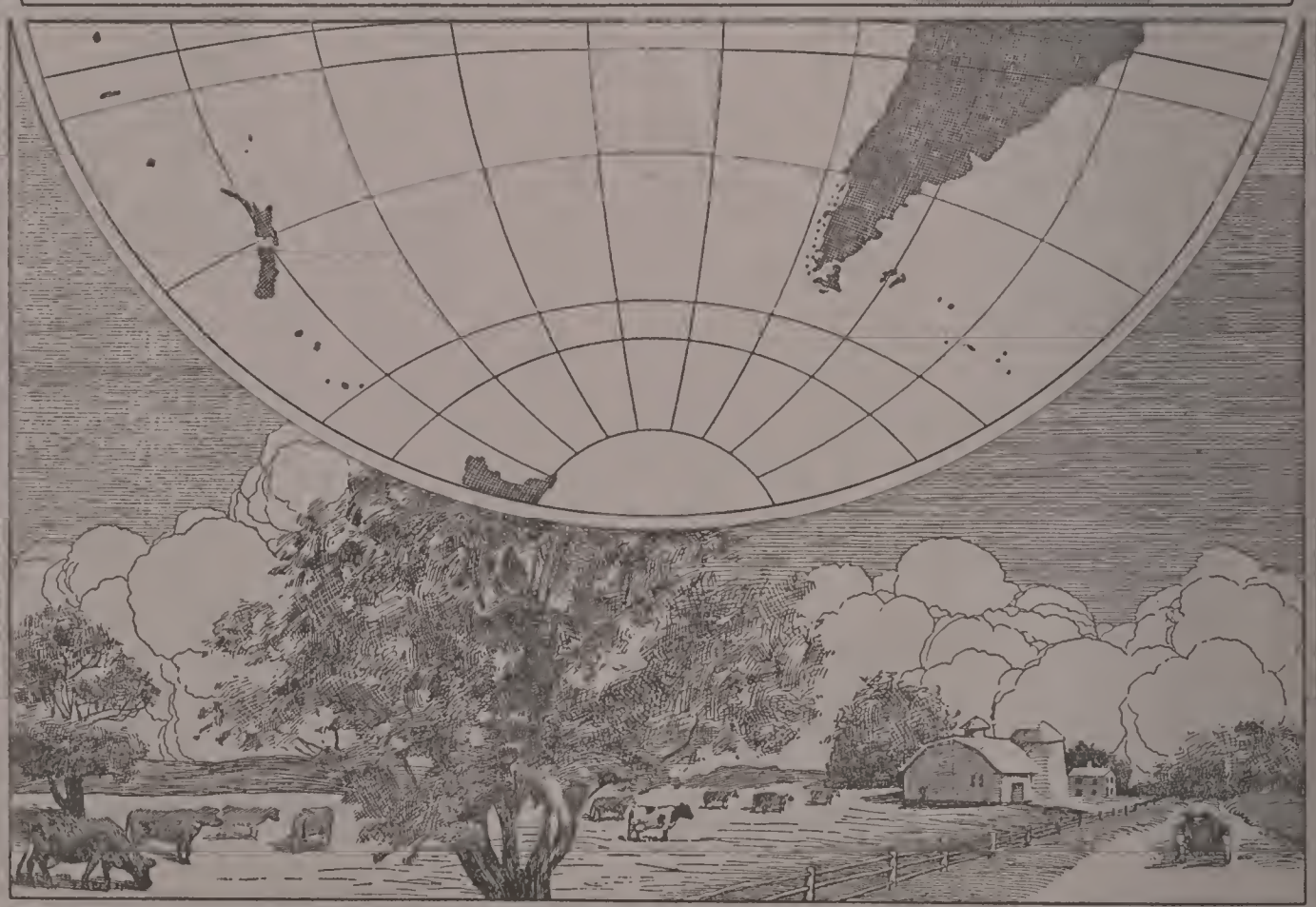
Taken as a body, the Mormons are temperate, industrious people. They do not use tea, coffee, tobacco or strong drink, nor are they addicted to profanity. There is no poverty among the Mormons; the Church is rich and is supported by tithes, which should be contributed by every devout member; the tithe is the ancient law of Israel, that one-tenth of the increase should be devoted to the Lord's work. The Great Temple in Salt Lake City is a striking witness to their thrift and their faith. This beautiful and imposing structure cost $4,000,000 and took forty years to build, the great granite blocks being drawn by ox teams from the quarries in the mountains twenty miles distant. There are three other temples in Utah, one in Logan, one in Manti and the other in Saint George. On the Temple Square in Salt Lake City there are two other edifices, the tablernacle, noted for its magnificent pipe organ, and having a seating capacity of 10,000, and the smaller Assembly Hall. These buildings constitute the official seat for the conferences held by the Mormon Church.

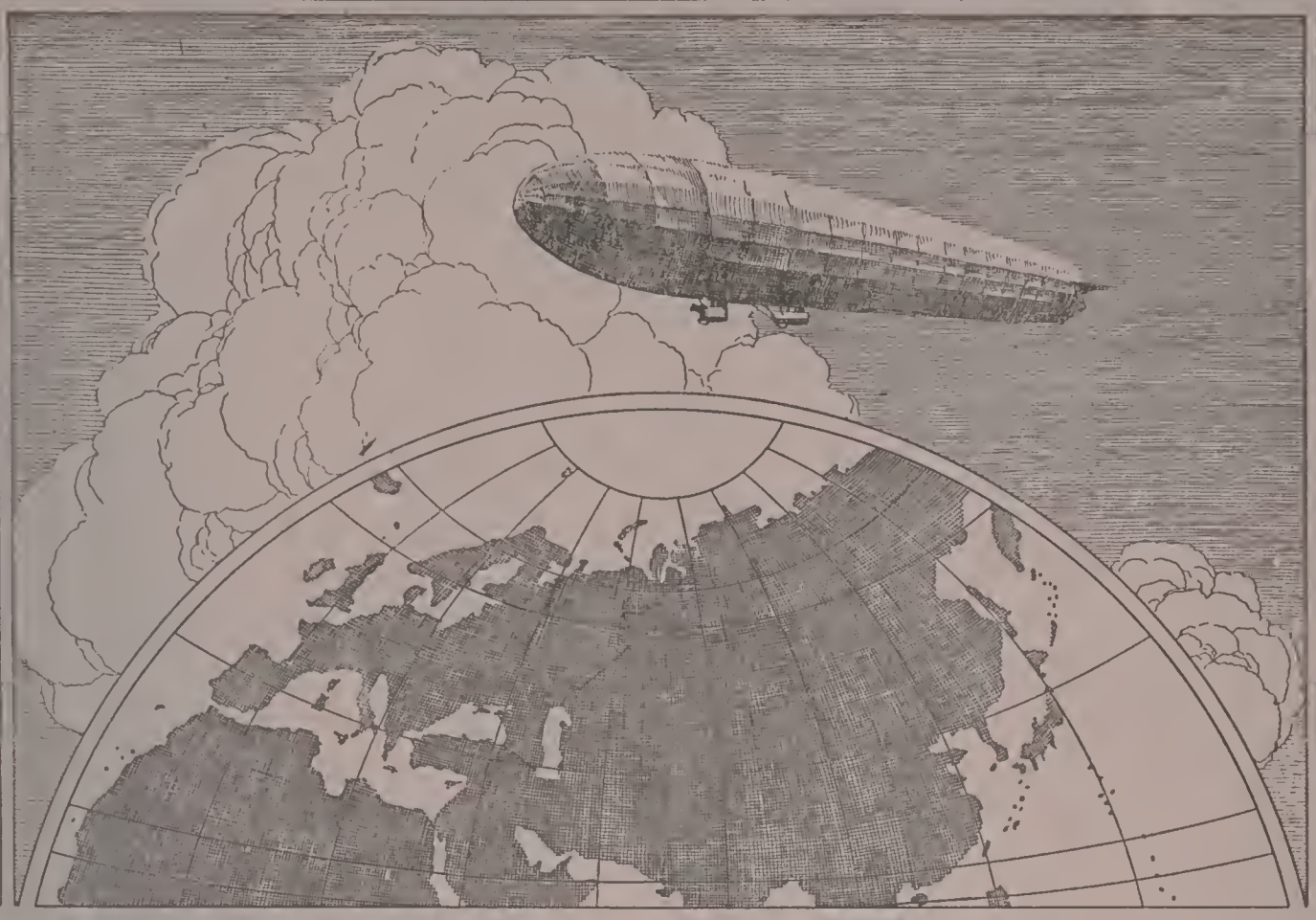
M.M.B.

Consult Shook's *The True Origin of Mormon Polygamy;* Talmage's *The Story of Mormonism.* The above are pro-Mormon. For anti-Mormon works consult Nelson's *Scientific Aspects of Mormonism;* Wilson's *Outlines of Mormon Philosophy.*

End of Volume Six

THE WORLD BOOK





THE WORLD BOOK

LIBRARY OF CONGRESS
0 033 261 118 5